The Builder.

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The Church of Orpington.

ORPINGTON had a church in early days of no small importance. Until comparatively recent times the four considerable adjacent churches of Downe, Hayes, Knockholt, and St. Mary Cray were but chapels of the mother church of Orpington. Mention is made of Orpington as early as the days of Canute; in 1032 Eadsige, one of the King's chaplains, gave his manor of Orpington to the Canterbury monastery of Christ Church at the time when he was entering that house as one of its canons. Irrespective of any possible fabric remains, it is impossible to doubt that there was at that time at least one, and probably several churches or chapels on Eadsige's large estate in Kent. At the time of the Domesday Survey there were three churches within the paramount manor of Orpington, one of them undoubtedly standing on the site of the present parish church. Of the other churches, one was certainly that of St. Mary Cray and the third was almost certainly that of Hayes, which was found to contain much Roman tile in its walls during restoration in 1862.

Considering the large area over which the church of Orpington was the mother church, and that contingents from the chapelries would be expected to attend on certain defined festivals, it is rather surprising to find that the fabric is not more imposing in size, for its interior length is only 100 ft. The population was, however, but sparse in mediæval days, and no special reason seems to have arisen for materially enlarging its original area. Estimates based upon the extant Kentish receipts of the Poll Tax in 1337 give the population of Orpington as 290, whilst the chapelries of Downe, Hayes, and Knockholt numbered respectively 167, 104, and 83.

The church of All Saints, which stands well above the long straggling village, consists of an aisleless nave, west porch, north tower—the base of which forms a transept chapel—chancel, and north chapel out of the chancel.

The fabric of the church shows work of Saxon date, considerable alterations in the XIIIth century, and several interesting developments and changes in the XIVth and XVth centuries. The walls are in the main composed of flint, slightly dressed on the outer surface, but with occasional pieces of Ashlar stone and a few fragments of Roman brick. When the church was undergoing restoration in 1873 it was possible, by the different colour of the mortar and cement, to detect three periods of construction or reconstruction in the nave walls, whilst many pieces of Roman brick or tile then came to light, as well as stones of an earlier chancel in the north chancel wall.

The interior measurement of the nave is 64½ ft. long by 22 ft. wide. This part of the church stands upon the pre-Norman foundations, and probably includes within the walls very much of the original structure of the church built here by Eadsige, or standing here when he transferred his property to Christ Church, Canterbury. Three years after Canute's wealthy chaplain had gone to Canterbury he was consecrated Bishop of St. Martin's, to act as suffragan to the aged Archbishop Ethelnoth. On Ethelnoth's death in 1037, Eadsige of Orpington became Archbishop of Canterbury; he died in 1050, but became incapacitated for any work shortly after he had crowned Edward the Confessor in 1043. At the east end of the south wall of the nave there are undoubted traces of Saxon workmanship; the old nave ended several feet nearer to the west, and the corner course of the beginning of the old chancel is also shown in long and short work. This was much more clearly demonstrated at the time of the restoration. Inside the nave, just behind the pulpit, are traces of Saxon arcade work. The style appears to be late in the period, and may quite possibly date from the time when Eadsige, the future archbishop, was leaving Orpington for Canterbury. It seems reasonable to suppose that he would leave his church in good order before transferring the estate to the great priory of the county.

Quite at the beginning of the XIIIth century, or towards the close of the XIIth, came the first alteration to the Saxon nave and chancel of Orpington, which, being well built and of good size for a country church of those days, required no alteration or rebuilding in the Norman period. The west doorway of the nave, within the porch, is a fine example of early pointed work of Transitional character. The two members of the deeply cut mouldings are respectively ornamented with the dog-tooth and bold chevron designs, and the two detached shafts in each jamb have well-cut stiff foliage in their capitals. This entrance archway has been rather clumsily repaired, but still retains much beauty of expression, though a good deal overshadowed

by the later porch. Probably the nave was slightly extended westward when this entrance was built. The lower stage of the tower is pure Early English, with very narrow, tall, and well-splayed lancet lights yet remaining on the north and east sides, and may quite possibly be of the same date as the west entrance, for several instances are known in which work which betokened Transition from Norman was done at the same time as the purer pointed. At all events the tower was added, at the latest, quite early in the XIIIth century. The position of this tower, as an adjunct to the east end of the nave, forming a quasi-north transept, with the basement used for a side altar, is unusual, but by no means altogether unknown elsewhere. There is one of like date and position at Abbotsham, North Devon. Towers at the east end of north aisles may be noticed in Kent at Dartford, Betteshanger, and Thanington, and also at Fordingbridge in Hampshire. Generally some reason can be found for an exceptional position for a tower. At Orpington the tower could not have been on the south side because of the nearness of the old rectory house and land; and if the west end and entrance are of a somewhat earlier date than the tower, as is quite possible, there would be a natural reluctance, when a bell-tower was required, to remove or destroy such recent good work. The area within the tower is about 14 ft. square; in the north wall is a small trefoil-headed piscina niche. It may here be remarked that the original tower was probably only of two stages. At a later date a shingled top or upper stage was added. A great storm in 1771 destroyed this timber structure and so injured the upper part of the masonry that much of it had to be removed. The upper embattled stage of the low tower now shows bell-chamber windows of brick, and the buttresses have been somewhat clumsily repaired with the like material at two different dates.

It would seem that the church folk of Orpington were content to use the Saxon chancel until about the middle of the XIIIth century. In 1873 the chancel underwent a great deal of renewal, particularly on the south side and at the east end; a part, too, of the north side had been obscured by a late XVth century chapel; but sufficient remains, particularly in the single-light window of the north wall, to enable us to say that the building of a new chancel was not undertaken till the Early English style was well advanced.

The great tithes of the large parish of Orpington were of considerable value. The church was not appropriated to the Canterbury priory, but the rectory was in the gift of the Archbishop and was one of his more valuable pieces of preferment. At Orpington, until comparatively recent times, there was the abnormal arrangement of having an endowed vicarage as well as an endowed rectory, the vicar being presented by the rector. In pre-Reformation days the rectors usually resided at Orpington, in the large house close to the church, as well as the vicars; but in post-Reformation days the rectory was regarded as a sinecure and the rectors were non-resident. The first rector of Orpington whose name is known was Hugh de Mortimer, who was also Archdeacon of Canterbury and Provost of Oriel College, Oxford. He was rector of Orpington from 1254 to 1270. Hugh de Mortimer was evidently a man of considerable means, and the chancel was probably rebuilt by him about the beginning of his incumbency.

After this date the fabric of the church seems to have been left undisturbed for upwards of a century. Towards the close of the reign of Edward III. a porch was added to the west end of the nave. It is of a fair size, having an internal measurement of 13 ft. 4 in. by 10 ft. 8 in. At this time, probably, an interesting, but somewhat disfiguring, alteration was made in the fine western doorway. The inner of the two shafts of the south jamb was cut away in the centre to admit of the intrusion of a holy-water stoup. This stoup remains fairly perfect up to the present day.

One of the special features of Orpington church is the canopied tomb in this porch. Interment in the porch or at the doorstep of the chief entrance was not infrequently prayed for in mediæval wills in token of humility, the testators sometimes specially stating that they desired to be beneath the feet of all hereafter entering God's House. Occasionally a coffin slab with incised cross or nearly erased inscription remains in its original position at the threshold, but actual mural monuments or any form of upstanding memorials within the porch are most exceptional. Nicholas, rector of Orpington, by will dated August 1, 1370, desired that he might be buried within the porch that he himself had recently erected. The tomb occupies most of the north side of the porch; the low placed slab of Bethersden marble has long ago lost any inscription or cross in low relief that it may have borne, but the beautiful crocketed canopy, of ogee shape, with a good finial and traceried cuspings carved in white chalk, is fairly perfect. Rector Nicholas, by his will, directed that his executors should duly provide for the celebration of masses for his soul and for the soul of Archbishop Stratford, his friend and patron. To his successor in the rectory he left his great breviary, noted after the Sarum use, and also his new ordinal, on condition that the next rector should not receive anything for dilapidations in respect of the five houses of the benefice that he had put in order. This entry points to residences for priests, not only at Orpington, but at each of the four parochial chapelries.

Nicholas's successor in the rectory was John Wodehull, who died in 1382. By his will he left 40s. to the work of Orpington church; but such bequests are fairly continuous in the majority of pre-Reformation wills, and do not necessarily imply that any important alterations were in progress. Bequests of this character usually only mean that a sum was given to the general fabric fund, which was used for any ordinary repair to roof, windows, battlements, etc.

At the very beginning of the XVth century a man of considerable eminence both in Church and State was rector of Orpington. John Wakering was rector for some years, exchanging Orpington for the rectory of Barton Turf, Norfolk, in 1407. Wakering was Master of the Rolls in 1404, Archdeacon of Canterbury in 1408, Canon of Wells in 1409, and from 1410 to 1412 joined with Sir Thomas Beaufort in the office of Keeper of the Great Seal. In 1416 he was consecrated Bishop of Norwich, and died in 1426. Whilst he held that see he built the Chapter House, and began the new Cloister of Norwich. Important and well-executed alterations at Orpington church were effected *circa* 1400, about the beginning of the Perpendicular period. These may, with much probability, be assigned to Rector Wakering. On each side of the nave are two good pointed two-light windows of that period, somewhat high up in the walls. Growth in the art of glass painting and greater appreciation of its suitability for church decoration were rife about this period, and probably brought about the insertion of these enlarged windows in the nave. To the same date belongs the blocked-up doorway on the north side of the nave, with its good but simple mouldings.

In 1475 Thomas Wilkinson was collated to this rectory by Archbishop Chicheley. He was a pluralist, holding at the same time the rectory of Harrow-on-the-Hill, and a prebendal stall at Ripon. He seems, however, to have resided throughout at Orpington. After holding the rectory for thirty-six years, he was buried here in 1511, and his fine brass is in the chancel. During the time of Wilkinson's incumbency there were various alterations in this church. The most important was the building of a chapel on the north side of the chancel, which was probably of a chantry character. This chapel, which has an interior measurement of 15 ft. by 10 ft. 10 in., and now holds the organ, was built on to the east side of the tower and the north side of the chancel, with arches into both tower and chancel. Against the east wall are two well-carved image brackets, one bearing the arms of Rufford—a chevron between three trefoils slipped—and the other, Rufford impaling a bend on a chief two mullets pierced. This latter coat was borne by the families of George, St. John, and Salway; we have failed to identify the particular Rufford who was the builder of this chapel, or the alliance that he made. The Rufford arms are repeated in stone on several shields about the archway into the chancel. In the north wall is a wide-arched four-light Tudor window; amid the tracery on the outside there is twice carved in the stone a slipped trefoil. Work that was executed elsewhere in the church at the same time that this chapel was built, or thereabouts, may be noticed in the priests' door on the south side of the chancel; in a three-light window high up on the south side of the nave, near the east end; and in the three-light west window over the porch. The round window high up in the west gable was an inappropriate insertion of the 1873 restoration. As to the chapel, a branch of the Rufford family had property at Crofton, a hamlet in this parish. There was a hamlet chapel of their foundation at Crofton, which served as a chapel of ease; but it was destroyed under the confiscating Chantry Act of Edward VI., although it was pleaded that the inhabitants were two miles from their parish and were often separated from it by flood water in the winter months.

Within the church, at the west end, is a good octagon XIIIth century font supported on a central shaft and four auxiliary ones; there is a coved font cover, terminating in a finial and drawn up by a pulley, which is apparently of late XVth century date.

In the south wall of the nave, close to the east end, are two small XVth century doorways, one on the ground and one about 5 ft. from the floor. The late Canon Scott Robertson, in a short article on this church, which he contributed to *Archæologia Cantiana* in 1880, thought that this latter doorway was too low for giving access to a rood loft, and conjectured that it led to a mural pulpit. There can be no doubt, we think, that both these doorways were connected with the rood loft stairs, and that there were further wooden steps from the upper one; but Canon Robertson may have been partly right in his surmise, for a lower side stage of the rood loft may have served for what we now understand as a pulpit, of which arrangement there is a Norfolk instance.

In the chancel there is a large aumbry with rounded head in both south and north walls near the altar; and there is also a small sedilia recess in the south wall, with a like head, but this seems to be an 1873 insertion. The low north vestry of the chancel, to the east of the north chapel, is modern; but, as the doorway out of the chancel is old, there probably was a vestry or sacristy here in mediæval days. In Thorpe's *Registrum Roffense*, published in 1769, there is a detailed account of the monuments in this church, most of which are still extant. The three oldest are brasses. On a gravestone in the chancel is a brass plate inscribed to the memory of William Gulby, Esq., who died in 1439, with an escutcheon of his arms—a chevron between three cross molines. In the centre of the chancel there used to lie the effigy and inscription of Thomas Wilkinson, rector of Orpington, who died in 1511. This fine brass has now been removed to the north wall for purposes of preservation; the effigy, which is 3 ft. 2 in. long, represents the rector in cope, almuce, surplice, and albe. The third brass bears the small effigy and inscription of "Mr. John Gover, bacheler of bothe lawes and vicar of this church," who died in 1522.

Several of the monuments have reference to the residence in this parish, at the old rectory or parsonage (which has since obtained the confusing and erroneous title of "Priory"), of the Hon. Richard Spencer, second son of Robert, first Baron Spencer of Wormleighton. He was born in 1593, and married a Kentish bride—Mary, daughter of Sir Edwin Sandys, of Northbourne. His wife's brother was an enthusiastic Roundhead, whilst Colonel Spencer, who raised a great sum of money for the King and two regiments of horse, was an equally enthusiastic Royalist. Ledger stones commemorate his death in 1661 and that of his widow in 1675. On the south side of the chancel is a monument to his fourth son, Richard, who died at the age of nine; the following is the epitaph:—

"Here lyes the blessed boy
His mother's jewell, father's joy,
The noble Spencer's bud, at nine,
An age of yeares in this youth's time:
Sweete blossome, blown for cutting down,
With fragrant dust to forme a crown."

His other sons, who died in their infancy, are buried elsewhere, but on ledger stones within the altar rails are inscriptions to his two married daughters and co-heiresses, Margaret Venables, 1676, and Mary Gee, 1702. Outside the rails are two other ledger stones commemorating Richard Gee, 1727, and his widow, Philippa, 1744.

It is curious to note that all the burials at Orpington are on the north side of the church. Only a few feet intervene between the south side of the church and the boundary wall of the old rectory. There are two well-grown yew trees on the north side.

NOTES.

Is London Bridge Safe? An alarmist paragraph under this heading has recently been published in some of the daily papers, but absolutely nothing is stated in justification of so reckless and mischievous a suggestion. The vague assertion is certainly made that since the widening of the footpaths an "extraordinary vibration, which did not exist previous to the alteration," is noticed by those who keep close to the balustrade, and it is added that "so great is the trembling resulting from vehicular traffic that every morning the gas mantles used in connexion with the incandescent lighting of the bridge have to be renewed." Truly the penny-a-liner must exercise great influence in the editorial offices of a paper that publishes such palpable nonsense as this. In the first place, it is quite impossible for foot-passengers to make any accurate comparison between the previous and the present vibration caused by traffic, unless aided by records furnished by correctly calibrated instruments. It is perfectly absurd to judge the present vibration by the faded memory of long-past mental impressions, and a little inquiry would have exploded the fallacy of the gas-mantle theory of vibration. We are perfectly familiar with the constructional details of the widening, and these are quite sufficient to show that the widened footpaths are quite solid and safe. But we have taken the trouble to make further investigation, and have learnt on good authority that the vibration on the footpaths is actually less than that on the cutwaters of the bridge piers. With regard to the incandescent mantles, it is certainly the fact that these have been breaking. This is due, however, simply to the fact that the lamp standards first employed were entirely of temporary character, and so were not fitted with anti-vibrators, such as are generally necessary in thoroughfares where there is heavy traffic. The permanent system of lighting will include anti-vibrators, and it is considered certain that no further breakages will occur. It is much to be regretted that certain daily papers persist in making themselves ridiculous by repeating fallacious rumours of this kind.

Reinforced Concrete in the Baltimore Fire. A useful exemplification of the fire-resisting qualities of concrete-steel is afforded by the United States Fidelity and Guarantee Building, which was exposed to a very high temperature in the Baltimore fire. This building is about 78 ft. high, and the concrete construction comprised the whole interior, and consisted of six platforms supported on columns. It was built about a year ago to replace the former timber interior, and left the brick walls standing at the rear and on two sides of the building. The front was composed chiefly of cast iron and plate glass. The floor surfaces, doors, window-frames, and partitions were of wood. All these combustible materials, together with the furniture, were entirely consumed in the fire, and the upper two stories of one of the brick walls fell; while the remainder of the brickwork was so damaged that it had to be taken down. It is interesting to note that the concrete construction was practically uninjured; in fact, the cantilever extensions of the floors in front and rear remained intact, and the attic floor carried a tier of columns reaching to the roof which it had never been designed to support. Although the floor slabs showed slight cracks, they were neither broken nor disabled. This building was the only one in the block which escaped destruction, and its endurance is a sufficiently satisfactory proof of the fire-resisting properties of concrete-steel.

Royal Commission on Coal Supplies. The work of this Commission appears to proceed slowly, because the inquiry into the extent and probable duration of the coal supplies of the United Kingdom is a very wide subject. A large amount of work has been accomplished, however, and from a recently published interim report we learn that the witnesses examined during the period covered have dealt chiefly with possible economies and improvements in connexion with the working, preparation, transport, and use of coal, as well as with the possibility of substituting other kinds of fuel, and of adopting power derived from other sources. The great possibilities of economy suggested by the witnesses make it desirable that their evidence should be carefully studied by the Commission in the interests of the nation as a whole. It is stated that local investigations into the available resources of the known coalfields are rapidly approaching completion, and it is hoped that the reports of all the District Commissioners will be received by the end of June next. Satisfactory progress has also been made with investigations into the available resources of concealed coalfields, a matter which, involving geological problems of supreme importance, will necessarily occupy a considerable amount of time. While no definite recommendations can be expected for the present, the work of this most important Commission is evidently proceeding in a satisfactory manner, and every possible care is being taken to avoid undue delay.

An Important Discovery. As the result of experiments with thorium oxide, Professor Baskerville, of the University of North Carolina, has succeeded in separating two hitherto unknown substances possessing distinctive

specific gravities and atomic weights. The first of these is a greenish powder, which has been named Berzilium, as the element was first observed by Berzilius in the form of vapour, but without identification; and the second is a pinkish powder, which has been named Carolinium, after the State in which it was discovered. The chief interest of these new elements is to be found in the fact that they are radio-active and self-luminous substances. From demonstrations made at the Chemists' Club, U.S.A., it is evident that their luminous and penetrative properties are very considerable, as samples of Berzilium and Carolinium gave forth a very perceptible glow when enclosed in cloth-covered tubes of copper, brass, rubber, iron, and glass. It seems likely that these substances will be of commercial value in connexion with illumination, but of course it is too early to predict the precise direction in which they will be found most serviceable. The next matter for inquiry is whether sources of the new elements can be found in countries other than the United States. As monazite, the mineral from which they were indirectly derived, is to be found in the Ural Mountains in Swaziland, and elsewhere, as well as in America, an interesting field for investigation is open to European scientists.

Losses in Electric Cables.

THE paper by Mr. M. B. Field, on the "Losses in Electric Cables," which was read to the Institution of Electrical Engineers this week, will be of great interest to the rapidly-increasing number of engineers in this country who have to distribute electric power over long distances. At the present time several hundreds of miles of high-tension three-phase cables are being put underground in London in connexion with the Underground Railways of London, Ltd., the Metropolitan Railways, and the Metropolitan Tramways. These cables contain three copper conductors inside a lead sheath, which is heavily armoured with galvanised iron wire. This armouring serves not only as a mechanical protection but also as an efficient "earthing" sheath, preventing any part of the sheath from attaining a dangerous potential. When the cable is not armoured, the Board of Trade insist that a copper sheath be made inside the lead sheath and connected with earth so as to prevent the former ever becoming dangerous. Mr. Field in his paper points out that the eddy currents induced in this copper shield are appreciable, and thus a considerable percentage of the power generated at the station is expended uselessly in heating this copper sheath. He deduces his results from theoretical considerations, and, as he has to introduce many assumptions in order to arrive at working formulæ, the accuracy of the latter is open to doubt. The pictures he gives of the magnetic fields round cables are very instructive. In some cases, however, the lines of force pass from air into copper conductors carrying currents without undergoing any apparent refraction. Whilst we agree with the author in thinking that the losses in the Board of Trade earth shield, and perhaps even in the lead sheath, are appreciable, we think that the losses in the conductors themselves due to eddy currents are much more important.

John Stow's Monument.

THE Merchant Tailors' Company are about to repair Stow's monument in the Church of St. Andrew Undershaft, Leadenhall-street. The monument, set up by his widow Elizabeth, represents the historian and chronicler of London as seated, with a writing-desk upon his knees, in a rectangular recess resting upon a base of white marble and surmounted with the carved coat-arms of the Company. The figure, which has every appearance of being an authentic effigy, was formerly coloured. It is often described as being of terra-cotta, but is for the most part composed of veined alabaster with black marble inserted in the frieze. The design of the composition is so similar to that of the contemporary monuments (illustrated in the *Builder* of September 25, 1886) of Richard Humble and John Trehearne in St. Saviour's, Southwark, that the three would seem to be by the same sculptor's hand. Maitland records that Stow's remains were disturbed in 1732, and, it is said, removed for the interment of some one else. Stow died, aged 80, poor and neglected, on April 5, 1605, and was buried close by his later home near the well, since known as the pump, within Aldgate. A tailor by trade, he was a freeman, as were his father and grandfather, of the Merchant Tailors' Company. In his old age he received from James I. a licence to beg and to accept alms. Three hundred years ago he brought out the first edition —the copies are dated 1598 and 1599— of his Survey of London, in a quarto volume of 483 pages printed in black letter, with an appendix, descriptive of London and then printed for the first time, written in Latin by William Fitzstephen, the monk of Canterbury and chaplain of Archbishop Thomas à Becket. In 1560 he edited Chaucer's poems, and in 1561 published the first annual volume of his Summary of the Chronicles of England. In 1580 appeared the first edition of his "Annales." A second edition, enlarged to 579 pages quarto, of the Survey was issued in 1603; meanwhile he republished the "Flores Historiarum" and Matthew Paris's and other Chronicles, 1567-87. The sixty MS. volumes, collected for the Chronicles of England and preserved in the British Museum, testify to his amazing industry and perseverance, exerted under most adverse circumstances and with much more profit to his successors than to himself.

Junior Army and Navy Club, St. James's-Street.

IN the course of next month will be offered for sale at the Mart the premises vacated by this Club which stand at the corner, south, of St. James's-street and King-street. The clubhouse, which has frontages of about 154 ft. to the latter street and of 48 ft. to St. James's-street, is held upon a direct lease from the Crown for an unexpired term of fifty-three years. The house was built in 1832, after designs by Sir James Pennethorne, as the St. James's Bazaar, comprising a grand saloon measuring 100 ft. by 40 ft., for John Crockford, who kept the gaming-house at the north end of the street. In 1882-3 the late Wyatt Papworth adapted the house for the occupation of the Junior Army and Navy Club. Papworth added a curb-roof to the return front in King-street, remodelled the interior, and added bay-windows to the front in St. James's-street.

The New English Art Club.

SOME of the best things in the present exhibition of the New English Art Club (Dudley Gallery) are among the professedly slight studies and sketches at the entrance end of the room. A sketch which is admittedly a sketch one can study with satisfaction; a sketch which pretends to be a finished picture is not satisfying. Mr. Fry's "Louvre" (1) and Mr. Rich's "Beeding Bridge" (3) are good sketches, and also Mr. Rich's "Ditchling" (12); Mr. MacColl's "Eelpie Island" (7) and Mr. Wilson Steer's "Morning" (8) may be classed as bad sketches. Miss Grace Westray's "The Roan Cow" (21), though slightly executed and with little colour in it, is something more than a sketch—the animal and the details of the wooden structure are very well drawn. Among the oil landscapes those of Mr. James Henry please us most, especially "The Flower Farm" (40), in which there is a most bright and breezy effect of light and air; and Mr. Charles's "A Quiet Nook" is noticeable for its effect of sunlight. Mr. Furses's contribution is a large oil sketch (it can hardly be called more) called "Timber Haulers" (77), a cart and horses backed by a clay bank in strong light; it is a vigorous piece of composition, but a canvas of that size should show more finish to justify its existence; all that there is in it might be shown on half the scale. Mr. Mark Fisher sends one of his bright landscapes, "On the Essex Weald" (58), and a portrait which, to say the least, is not as attractive as the landscape. Mr. W. Rothenstein's two pictures of scenes in the Talmud school (52 and 105) contain fine earnest studies of heads.

THE CENTENARY OF THE WATER-COLOUR SOCIETY.

THE Centenary Exhibition of the Royal Society of Painters in Water-colours is an interesting event in the artistic world. No art society ever started in this country has had such a continuous and increasing success, so that at the end of its hundred years of existence it appears to be at the stage of its greatest prosperity. The progress in the art of water-colour painting itself, and the changes which have taken place in its aims and in the style of execution employed, form an interesting subject for consideration.

The Society was originally formed, as we learn from the historical preface to the catalogue contributed by Mr. Spielmann, from much the same motive which has recently led (though with less reason) to the proposal to form a Sculptors' Society—viz., the want of liberality and sympathy on the part of the Royal Academy. A hundred years ago water-colour was a comparatively new art, which had none of the history and prestige attaching to oil-painting; and the Academy, which was then, as now, practically an academy of oil-painters, would give no encouragement or advantage of position to the water-colourists, who accordingly determined to form their own society and hold their own exhibition. The spirited nature of this determination can only be fully realised when we consider that in those days the rule of the Academy was that no member of it could

belong to any other artistic society, so that the first members of the Water-colour Society cut themselves off by their action from membership of the Academy. The first exhibition, however, held at Vandergucht's Gallery at 20, Lower-Brook-street, was an immediate success, 12,000 paying visitors having entered during the seven weeks that it was open. That the water-colour painters and the art of water-colour could stand alone was from that time demonstrated.

The number of members was at first limited by the rules to twenty-four*, and, in fact, only sixteen were actually elected. The following are the names of the original sixteen :—George Barrett, Joshua Cristall, W. S. Gilpin, John Glover, William Havell, Robert Hills, T. Holworthy, J. C. Nattes, F. Nicholson, N. Pocock, W. H. Pyne, S. Rigaud, S. Shelley, Cornelius Varley, John Varley, and W. F. Wells. Of these names it may be said that only those of Barrett and John Varley are now familiar to general amateurs of painting; among a smaller circle Cristall, Gilpin, Glover, and Havell are still familiar names; the rest are all but forgotten. Turner was precluded from joining by the fact that he was by that time a member of the Royal Academy. Times have changed since, and at the present moment the Society includes among its ranks the President and six other Members of the Royal Academy, and eight Associates of that body.

The change from the style of water-colour at the date of the foundation of the Society to that illustrated in the present-day exhibitions is remarkable, and in many respects it represents progress, but perhaps not entirely. The water-colour palette of early days was a very limited one, and its extension was almost a necessary condition for enabling the art to maintain its position against the more brilliant and varied resources of oil painting. In the present day the water-colour artist has as great range of colour as the painter in oils, and to a considerable extent avails himself, very often, of the means of laying on opaque colour. But though greater brilliancy may be obtained by this means, and some difficulties got over, the real genius of water-colour consists in the use of transparent colour, the abandonment of which takes from it a good deal of its special beauty and distinctive character. It is for this transparent effect, so especially suited for landscape, that water-colour really has the best right to exist as a separate art, and as, in the first instance at all events, a peculiarly English art, the best productions of which, even now, are not equalled anywhere abroad.

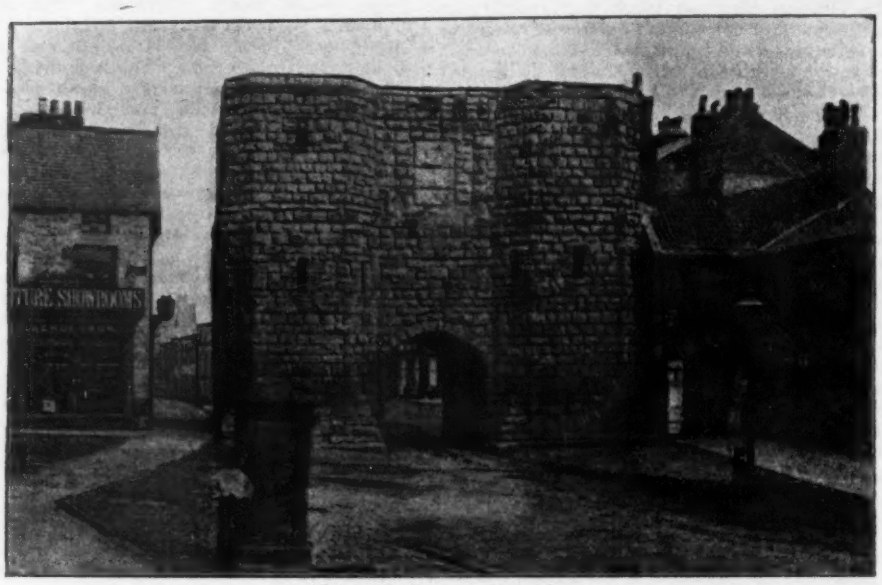
The sober tones ("sombre," one might sometimes say) of the school of Varley and his compeers have been replaced in more modern water-colour landscapes by a satisfying richness and variety of colour which in themselves are an absolute gain. But in the latest period of the Society's history one cannot but feel that we have seen attempts to make fascinating effects of colour which have nothing analogous in nature. One accomplished member produces views of cities or other architectural subjects which are like visions in a dream rather than reality. Others seem to make a study of a certain favourite effect of colour which comes into all their works, and which again is not a colouring or a texture recognisable in nature; or we find drawings in which the aim seems to be to try with how little truth or definition of detail the general impression of a scene may be conveyed. All these are, in their several ways, interesting artistic experiments, and have a fascination as long as they are new; but they will lose it when they lose their novelty. Nature is the safest basis for landscape-painting (which is more especially the sphere of water-colour), and those who desert nature for artificial effects may obtain a passing but not a permanent success. The time will come when their works will be looked on as experiments which are out of date.

In the preface to the catalogue it is hinted that there has been dissatisfaction among artists at the too exclusive attitude of the Water-Colour Society; in other words, the difficulty of getting elected. Our opinion is that of late years the Society has not been exclusive enough. In the main the exhibitions of the Society show a higher proportion of good work to bad than is to be seen in any other art exhibition; but if this is to be kept up they cannot be too particular or too hard to satisfy in their choice of new members. We are inclined to surmise that the election goes too much by capability of technique and not enough by considerations as to artistic aim and feeling. What good can such pictures as those of Mr. Glindoni do for any Society which wishes to keep to a high standard of artistic style and feeling? They may please a certain portion of the public, possibly; but the Society has a strong enough position to afford to be independent of the public. What good did they do themselves by the theatrical effects of the late Mr. Brewtnall? And other similar questions might be put. If the Society is to maintain its high position, it should confine its elections to artists who take art seriously, and not admit painters of merely commonplace or jocular pictures merely because they have acquired dexterity in handling the brush.

To come to the present exhibition, we do not know that the Centenary show can be said to be superior to the average of the exhibitions (a high average, no doubt), or quite equal, for instance, to the last one. It is a very good exhibition, but if there has been at all an attempt or intention to make it a specially significant one, it has hardly been realised. In hanging the first dozen or so of pictures, however, there has been an evident intention to present to the spectator, at the outset, a kind of series of examples of various classes of work and of subject. We have Mr. Eyre Walker, Nos. 1 and 5; the latter, "Fallow Land in Surrey—Mayweed," is a landscape out of its author's usual track, light and delicate in colour and depending much on foreground detail; Mr. Tom Lloyd comes second, with a landscape and figures; Mr. Herbert Marshall follows with "Ely Cathedral" (3); and Mr. Thorne Waite is fourth with "Romney Marsh in Sunset." Then comes Mr. Weguelin with a sample of nude figures on "A Wave-washed Shore" (6), a very good little picture except the waves; but they are not the main object; the two figures are charmingly grouped and drawn, and Mr. Weguelin appears to much more advantage in these freely-drawn and not highly finished figures, in a style of his own, than he did formerly in pictures which looked too much like attempts to emulate Sir L. Alma-Tadema on his own ground. An interior with figures, "The Connoisseur" (7), shows one of the recently elected members, Mr. Walter West, at his best (that election was no mistake, at all events). Mr. R. W. Allan's "Sheltered" (8) is a good example of his sea-coast class of works; in this case the ships are better than the sea, the colour of which is rather doubtful; and Mr. Paterson's "Moniaive" (9) is one of those broad, impressionist landscapes in which, without any detail, a kind of enamelled softness of colour suffuses. The scene, which is pleasing to the senses, but which leads one to ask whether one ever really sees that effect in nature. Mr. Matthew Hale's view of "Pisa" (10), and a landscape by Sir Ernest Waterlow, "Summer Evening, Hampshire" (11), bring us back to the regions of the *juste milieu*; and so the first page of the catalogue is filled, certainly with a sufficient variety of interest.

We know which is the most remarkable work in the exhibition, but the Hanging Committee did not, or they would have hung it in a more central position. Miss Fortescue Brickdale is the most notable artist among their recent elections, for she combines intellectual meaning with competent execution. Artists who put intellectual meaning into their pictures do not always quite keep the balance between art and moralising; Miss Brickdale has not quite done so in her "Scandal" (74), which is not altogether beautiful in a pictorial sense, nor does it tell its meaning very clearly. But her other work, "The Posthumous Child" (130), is a most remarkable production. It is an allegorical picture. In a deep glen, with her feet among thorns and thistles, a beautiful young woman in widow's mourning leans against the rocky barrier on the right, her figure and drapery designed so that they make the commencement of a curve which is continued above by an indistinct rainbow, within the line of which an angel, beautiful in colour, with outstretched wings, leans over to her, and in front of the angel hovers in the air a little figure of a naked infant with its hands full of forget-me-nots. It is as thoroughly a poem in painting as we have ever seen, and one in which the pictorial effect and composition are as complete as the pathetic interest of the picture. It ought to have been hung in the place of honour in the centre of the end wall, for in respect of the higher aims of art there is nothing in the room equal to it; but it is a work that not many people would really understand. The place of honour is occupied by Mr. Melville's "The Music Boat" (65), a very clever effect of spots of light and colour from Chinese lanterns and other accessories; but it is a clever piece of effect—no more. What may be called the colour-spot style of painting is remarkably illustrated in Mr. R. W. Allan's "Piazza de Popolo, Orvieto" (14), showing one of his favourite combinations of broadly painted architecture and a crowd in many-coloured costumes. Those who think that colour-spot painting depends on happy chances should notice the quite satisfactory delineation, at the proper distance, of the horse in the centre of the picture, and realise, on a closer view, that its legs are only spots of colour, the effect depending on the exactly right shape of each spot. What seems free and accidental in handling sometimes contains the most study. This is the newest method in water-colour painting; nor do we say "the old is better," necessarily, but it is different. Methods of widely different dates may be studied here. Mr. Callow, who has been an exhibitor ever since the present writer can remember the Society's exhibitions (and that is a long time), shows a large and well-composed scene in his "Castle and Town of Richmond" (35), in which, moreover, he is less mannered than in his too frequent repetitions of old German streets. Among figure pictures of importance is to be noted Mr. Anning Bell's "Music by the Water" (114), where four women form a very decorative group in front of a river and part of an old city; a picture quite out of the usual run, both in colour and composition. Mr. E. R. Hughes sends two important works. The first, "The Lesser Light" (125), the moon with a personifying maiden designed within her sphere, is the most ambitious and the most difficult, but perhaps not the most successful of the two; the nude figure rather wants beauty of line, and beauty of line is the chief justification for this kind of ideal. The other, "Perdita Found" (134)—"a barn, and a very pretty barn"—is a capital piece of Shakspeare illustration, both in the character of the old shepherd and the lovely face of the child. Miss Phillott exhibits a larger and more elaborated work on a classical subject than is usual with her, "The Herdsman of Admetus" (156), a picture with a good many figures, the divine Herdsman appearing on the left walking in company with a rural maiden, and with just an indication of being something more ethereal than the other shepherds; a pleasing rendering of an ancient legend. An artist who has hitherto confined himself entirely to decorative Greek subjects, Mr. Bulleid, has suddenly and unexpectedly taken a quite different turn, painting three scenes from the life of the Virgin—"The Annunciation," "The Mother's Love," "The Crucifixion" (192 to 194). The first is the best, though the air of realism of the Virgin and of the surroundings clashes a little with one's conception of the mystic character of the story; the angel is certainly not mystical at all; but one feels every sympathy with an artist who appears to feel that he has harped upon one string for too long, and who is seeking a new interest and a new class of subject. At present he is not so successful in this as he was in his Greek maidens with sculpture backgrounds; but he will perhaps go farther. One or two other members interest by flights in a new direction. Mr. Colin B. Philip has quitted his Highlands for the Norway Fiords; his grand scene on the Norang Fiord (47) is very fine, especially the middle distance mountains, though we do not know that it equals his treatment of the Scotch landscape; but of course, after years of painting and imbibing the feeling of one region of mountainous country, one does not grasp that of a new one all at once. His "Break in a March Storm, Loch Lomond" (62), is full of weather, so to speak. Mr. Robert Little, too, goes out of his usual beat in a scene with architecture and figures entitled "Homage to Lorenzo de Medici" (189), a picture of a class which does not interest us very much, though well done of its kind; his "Rising Storm on the Solway" (57), with the trees forming a wind-tossed screen in the foreground, is a fine landscape in a grand broad style, the only drawback being that the water of the Frith seems rather neglected; we know it is water from the composition of the picture; we should hardly know it otherwise. Among other landscapes not to be passed over are Mr. Eyre Walker's "November Sunshine, North Yorkshire Moors" (66), perhaps the finest landscape

* The present limit of numbers appears from the published list to be forty Members and forty Associates.



Hotspur's Tower, Alnwick.

in the room; Sir E. Waterlow's "The Mill Pool" (118); Mr. Pilsbury's No. 128 (no title), which includes an admirable study of a large tree; and Mr. Cuthbert Rigby's "Ennerdale" (143).

Architectural subjects are rather largely represented. Those by Mr. Rooke are all good and carefully studied, but a little dry and uninteresting in style. Mr. Albert Goodwin makes a perfectly beautiful picture out of "Durham" (137), taken from a point down by the river, but to the south of the Cathedral—not the most usual view; the scene in this case, though perhaps a little over-refined in effect, is not so purely visionary as some of his town and cathedral scenes. Mr. Reginald Barratt is the real architectural painter in the Society now, and all his works of this class are as nearly perfect as they can be; without neglecting pictorial effect, he gives the real appearance and texture of the architecture. A curious and very originally treated interior, "Evening, St. Jacques" (59), by Mr. Cameron, should be noticed; its main point is the colour effect of the red altar canopy seen in the background amid the cold colour of the stonework which forms a frame to it; we do not know if it is a real building; it is essentially a bit of interior effect, and very artistic as such. Mr. Herbert Marshall exhibits a fine and accurate view of Southwark Bridge and St. Paul's.

We should not have omitted to notice Mr. Hemy's excellent sea piece, or rather sea and ship piece (for the craft are as important as the sea), "A Yacht Race" (28), in a sense a repetition of the idea of his picture "Youth," but with a different composition. We may observe also that Mr. Walter West has painted a very interesting picture of "A Private View at 'The Old Society'" (195) in the early part of the last century, with a careful study of the costumes of the day; the pretty young girl in the foreground, with her wide bonnet, long frilled drawers down to her ankles, and the big sash with its ends dropping nearly to the floor, is an amusing reproduction of what we suppose some of the oldest people now living can remember as the dress of their sisters when they were boys.

We heartily wish the Society another Centenary as successful as this one. But to that end let them aim high and keep up their standard of admission, and never mind what people may say about being too exclusive. In art exclusiveness is a virtue.

MISSION HALL, GATESHEAD.—St. Hilda's Mission Hall, situated in Lobley Hill-road, High team, has just been dedicated. The building, 66 ft. by 32 ft. inside, and capable of accommodating 394 persons, forms the beginning of a scheme which the Church Extension Committee have in hand. It is of one story and built of brick. Internally it is fitted with an open timbered roof, and there is a glazed brick dado. The chancel is cut off by revolving shutters, so that the mission hall may also be used for entertainments when required. A classroom is to be added to the building later. The cost of the work completed is 1,418*l.* 2*s.* Messrs. Hicks and Charlewood are the architects, and the contractors have been Messrs. John Ross and Son.

OUR TOWN-WALLS AND THEIR GATEWAYS.

IN the press of new undertakings, discoveries, and requirements we seldom give any attention to our possessions in the way of the ancient fortifications of our old towns. In their day they must have been very great achievements, and only accomplished with immense trouble and great cost. We learn that the wall round Coventry was forty years in hand; that round Shrewsbury thirty-two; that round Alnwick took nearly half a century to complete. As we look back, it is curious to picture the most considerable towns in England and Wales, Scotland and Ireland, as all ringed round with high and thick walls, too high to be scaled without ladders, too thick to be overthrown without undermining or other long process, all of which were furnished with gateways capable of defence, varying in number according to the length of the circumvallation, and many of them with towers at intervals. Some had three gateways, some four, some six or seven. Coventry is counted to have had twelve, though Canterbury had but six, and Newcastle-on-Tyne seven, besides posterns. They consisted of an archway with a chamber or chambers above it, often flanked by a tower on either side, but not always, as we may see in Southampton and Lincoln. The archway was usually of the width to admit of two armed men on horseback riding through it side by side. Over it on the outer side were the machicolations destined to destroy or deter besiegers; within were gates, and very frequently portcullises, as the grooves made for their descent testify. The walls in many instances became encumbrances and were taken down; in others they were razed to the ground by royal edict as penalty for the part taken in the Civil War; hence it has come to pass that very few are remaining in their integrity. Many towns, however, have still fragments of them; and some that have taken down their walls have kept the gateways intact, or some of them. The principal gates of the City of London were taken down as inconvenient in 1760 and 1761, and the materials sold.

Berwick-upon-Tweed, York, Chester, and Conway have all maintained their walls in good condition to the present day. We can walk upon the tops of them all and survey the adjacent neighbourhoods from their height. They are wide enough for two persons to walk abreast upon them, and in some places at Berwick much wider. Berwick has three out of its four gateways still standing. They are named Scotchgate, Shoregate, and Cowgate, and the second and third have their massive wooden gates with their bolts and hinges. The fourth gate was named Bridgegate. The wall is not that which Edward the First built and Bruce strengthened, that the Percies and Douglases looked upon, but an earthern fortification faced with good stonework built in the days of Queen Elizabeth. It measures a mile and a quarter and 272 yards in length. It is wind-bleached and tempest-swept, but on parts of it the rocket, or *Diplotaxis tenuifolia*, grows plentifully.

The silvery-grey walls at York are in praiseworthy repair, as are the four great gateways or bars—Michelgate Bar, Bootham Bar, Monk Bar, and Walmgate Bar. The first-named was the one on which the heads and quarters of traitors were displayed. It still bears upon its noble front the arms of France as well as those of England; and on its summit are stone figures that were supposed to confuse besiegers as to the numbers of the garrison; it has, however, been shorn of its barbican. Bootham and Monk Bars have also lost their barbicans, but retain their portcullises. Walmgate still possesses barbican, portcullis, and embattlements, though the inner front has been altered from its original form to secure more accommodation within. Leland, writing of York, tells us that a chain of iron was passed across the river from tower to tower in his day, and that Fishergate Bar was walled up in the time of Henry VII. The wall is considered to have been built in the reign of Edward the First.

Chester, like York, had a wall as early as the days of the Roman occupation, and fragments of it and other Roman work are often found when excavations are made. There are four gateways to the present noble wall—East, West, South, and New Gates. No one can walk upon it without being reminded that Charles the First watched the fortunes of his followers from the Phœnix tower on it, and that the gallant city stood out for twenty weeks against the Parliamentary besiegers after Sir Marmaduke Langdale was defeated. The circuit of it is more than a mile and three-quarters in extent, and in some places it is twelve feet high, and in others more, according to the fall of the ground. It has been maintained by murage duties collected by officials called muringers. The memory of a daughter of King Alfred is associated with Chester, as having extended the first circumvallation of the ancient city.

The wall at Conway is a mile and a quarter in length. It has twenty-one semi-circular towers along its course, and three great gateways, besides posterns, or minor entrances. This was built by Edward the Frist, who also reared the walls round Carnarvon, some of which we may still see, and Beaumaris. Curiously, the name of his master-mason at Carnarvon has been handed down. It was Henry le Elreton.

We may gather that permission to enclose a town did not always include the means to do so. Edward the Third gave the inhabitants of Bamborough leave to strengthen and crenellate the borough with a wall of stone and lime, of which they do not appear to have availed themselves.

There are three documents preserved among the muniments of the Corporation of Alnwick that give us a good idea of the difficulties of wall-building. The burgesses obtained a licence to build a wall in 1433, which states that the town was open, and had been lately burnt by the Scots, in consequence of which danger the King gave his cousin Henry, Earl of Northumberland, and the burgesses leave to enclose the said town and embattle and machicolate the walls (Patent Rolls, Hen. VI.). In 1448 the town was still unprovided with this defence, and the Scots set fire to it once more. The first of the three documents in the possession of the Alnwick Corporation is a petition that the burgesses should be exempt from any fees for the licence. It states that the wall is begun, but cannot be finished for want of funds. The second document, dated April 9 and the forty-second year of the monarch's reign, sets forth that the burgesses had been again robbed and spoiled by rebels, and their dwellings burnt, and the King, who is mentioned as King of England and France and Lord of Ireland, in consideration of their misfortunes, grants them a port at Alnmouth and 20*l.* for thirty years out of the customs and subsidies with which they were to make the port, wall the town, and repair the parish church. The third document is "Letters Patent to gather a collection for building the town wall against the Scots." This is dated February 1473, or forty years from the issue of the licence. We learn, too, that William of Alnwick, Bishop of Norwich, left by will (proved at Lambeth 1449) 10*l.* for the walling of the town and 10*l.* more for repairing the church. When at last finished, this wall was about a mile in circumference, twenty feet in height, and six in thickness. It had four gateways—Bondgate, Clayport, Pottergate, and Narrowgate. Only the first-named of these is standing. It is three stories in height. Over the central archway is a panel on which was carved the Brabant lion, now almost obliterated. On either side is a semi-octagonal tower. The masonry is composed of huge blocks to which time and weather have given dusky tints. On the front facing the expected

foes the openings are but little more than arrow slits; on that within, facing the town, are well-proportioned mullioned and transomed windows. The great ribbed archway is grooved for a portcullis now removed, and a low doorway on either side gives entrance to the chambers in the towers. Pottergate was rebuilt in the eighteenth century and crowns a steep street; only four corner-stones marked T indicate the site of Clayport. No trace of Narrowgate remains.

We come across mention of some of these old fortifications in the journals kept by travellers, as well as in the works of olden antiquaries. One Thoresby of Leeds wrote in 1681, "Over the moor from Morpeth to Alnwick, an ancient town fortified with a curious castle and an old wall." Evelyn mentions Coventry walls: "This citty has many handsome churches, a beautiful wall, a faire fine schole and librarie to it"; and York, he says, is "fairly walled, of a circular form watered by the brave river Ouse." Colchester, he tells us, had six gates and some watch towers, and he describes the walls as exceeding strong and deeply trenched, and mentions with deep feeling a bare space outside the wall where Sir Charles Lucas and Sir George Lisle were shot after they surrendered. Defoe, too, alludes to this bare place (where the inhabitants said nothing would grow), the battered walls, and breaches in the turrets, in his "Tour through the Eastern Counties." Pepys mentions walls and gates many times. On February 10, 1660, for instance, he writes that Monk had pulled down the most part of the gates and chains in the city, and on the 22nd that the House had voted that the gates of the city should be set up at the cost of the State; and a little later that the gates of the city were ordered to be shut and doubled guards to be placed everywhere. Concerning Southampton he wrote:—"The town is one most gallant street and is walled round with stone, etc., and Bevis's picture upon one of the gates." He made a note, too, that he saw the limbs of "some of our new traitors set upon Aldersgate, which was a sad sight to see." Dr. Johnson tells us he found the walls of Shrewsbury were not so good as those of Chester. Dora Wordsworth in her Scottish tour wrote that she and her brother and Coleridge walked upon Carlisle walls, which were broken down in places and crumbling away "and most disgusting from filth." Macaulay mentions that he walked on the walls of Londonderry four times. George Eliot records that she and Mr. Lewis walked with Sir Benjamin Brodie about Oxford and "saw the gardens of New College surrounded by the old city wall." Perhaps the most pleasing of literary associations connected with a gateway is that given us by a document preserved by the Corporation of the City of London. Geoffrey Chaucer rented Aldgate, "the whole of the dwelling-house above the gate of Algate, with the rooms built over, and a certain cellar beneath the same gate on the south side of that gate and the appurtenances thereof," and undertook not to sublet it, but to live in it himself all his life. The Mayor reserved the right to enter it in time of danger to the City, and to use it then as might be requisite. This gate, thus associated with "the Father of English Poetry," was taken down, with others, in 1760, and the materials were sold to the highest bidder. He gave 177*l.* for them. Ludgate when taken down brought but 148*l.*, and the others still less.

The use of gateways for the exposure of the heads and limbs of the vanquished or of the executed gives them a very different aspect. Those who have sought such matters out tell us that the head of the Earl of Northumberland, who perished on the field of Bramham Moor, was exposed on London Bridge, and his quarters at Lincoln, Newcastle, and York. The head of Hotspur was brought from the battlefield near Shrewsbury and placed on the gateway at London Bridge, and his quarters were taken to the gates at York, Lincoln, Newcastle-on-Tyne, and Berwick-on-Tweed. A few months afterwards, in both cases, writs were executed requiring the authorities of those places to deliver up the remains for "holy sepulture." The head of Wallace, another world-famed hero, was set on London Bridge, and his body on Berwick Bridge. The head of Montrose was fixed on the Tolbooth in Edinburgh. Argyll's head was exposed in the same place. The account of Margaret Roper's pious care of her father's head will come to mind, and its subsequent burial beneath the chancel of St. Dunstan's Church, Canterbury. Local offenders seem to have received local exposure, as a hermit who headed an insurrection in Canterbury in 1449 was executed, and his head placed on the Westgate there. A German traveller, Hentzner, who visited London in 1598 says he saw thirty heads on London Bridge. Temple Bar, somewhat later, competed in this terrible exhibition. Horace Walpole mentions that some people made a trade of letting spyglasses for others to look at the heads on Temple Bar "at a halfpenny a look."

The various contrivances with which besiegers endeavoured to overcome the resistance of the walls are a study apart. There was the tall tower covered with hides, in which was a means of ascent that enabled those within, when wheeled sufficiently close, to attack those on the wall from the same level. This contrivance was called a sow in old Border verse. Then there was a lower erection made to be thrust close to the foot of the wall, that those within could make a hole through it, which the besieged circumvented by throwing heavy stones on it, and made useless by raising a new barrier that confronted the breach and left the invaders still outside of the defences. There were huge catapults that flung stones over the walls, and battering rams that were intended to shake them to their foundations. The devices of the besieged were as ingenious with their showers of molten lead, their masses of burning flax let down by ropes or chains to swing in front of the faces of the foe, their overhanging wooden additions to the tops of the walls, known in old writings as "huards," from which cover they could annoy any enemy that approached, and always feel their defence was stronger than the attack till famine began to tell. Very interesting illustrations of all these contrivances, and more, are given in M. Viollet-le-Duc's matchless work on the subject.

Among the fragments of walls still standing those at Newcastle-on-Tyne are very massy, sooty, and impressive. Those at Southampton are sufficient to show us how considerable the defence once was. Sandwich, that saw so many princes come and go, has only one gateway of those old times, but has a length of green embankments called the Boulevards. Rochester and Canterbury can point to fragments, if not "gallantly great" as Pepys would say, still of interest. In short, from whatever point of view we take up the subject, there is veritable attraction in it. S. W.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION:

"Volume I of THE BUILDER."

THE eleventh meeting of the Session was held at No. 18, Tufton-street, Westminster, S.W., on Wednesday evening, when the chair was taken by Mr. J. H. Pearson, and a paper was read by Mr. W. E. Davis on "A Retrospect: Vol. I. of the *Builder*."

Mr. W. E. Davis said that at the outset it was well to recall to their imagination London as it was in 1843, so far as it concerned so many of the buildings and places which were now looked upon as landmarks. Few things had affected this so much as the growth of railways, and in 1843 there was no Charing Cross, no Victoria, no Cannon-street, no Waterloo, Ludgate-hill, St. Pancras, King's Cross, or Liverpool-street, while the underground was not even thought of. Trafalgar-square had not long been laid out; the National Gallery had been finished about five years and must have looked somewhat of a patchwork, being partly of new and partly of old material from old Carlton House. The Nelson Column was just approaching completion as were also the British Museum, the Royal Exchange, and the Houses of Parliament, as well as numerous smaller but still important works. If London had changed, what was to be said of the journal, the first volume of which he had made the basis of his paper? The first number was published in December 31, 1842, and was evidently thrown out as a "feeler," as it was boldly announced as a "precursor number." It contained 48 columns made up of 4 columns of address, 1½ columns of notices as to subscriptions and advertisements, 31 columns of advertisements, and 2 columns at the end of a sort of combination of address and puff; leaving 9¾ columns of matter for which the paper was ostensibly published, and even a great deal of this quoted. To him, it seemed that it must have had enormous vitality to have survived at all. They must, however, remember that it was a new departure and that up to this time there was, to quote the address, "no such thing as a builders' newspaper and magazine." There was no doubt that the paper was originally intended primarily as a periodical for the artisan, and the first edition was certainly most flattering to the trade which it termed "of the pick of British artisans, a class of the highest intelligence." The proposal was for a combined newspaper and magazine and the address said: "We would give him a book on his trade, worth preserving, and a newspaper, for the reading of his wife and family as well as for himself." One must come to the conclusion that either wives and families had changed or the conductors of the *Builder* at the present time had lost sight of the intention of the original promoters. He did not think the present editor, with his justifiable pride in the paper under his control, would seriously claim for it consideration as a family newspaper. The engraver must have been a godsend to the editor of the time, for his shortcomings were being frequently apologised for. In presenting a view of the new Town Hall at Colchester he made the date of erection twenty years ahead of his time, and in the plans of a pair of cottages by a "practical builder" the kitchens and back bedrooms to both and the staircases to one were shown without windows. History repeated itself, for they found complaints as to the non-recognition of architecture by the Academy; a reference to a commission for the improvement of the means of communication to different parts of the Metropolis; flying machines; competition scandals; the inadequacy of the payment of architectural draughtsmen and surveyors' assistants; a suggestion for supplying the Serpentine with salt water; the use of oil on a rough sea; emigration; trades unionism; wide tendering; housing of the working classes; electric lighting, and many other subjects, including a new Building Act, which, however, after being drafted, was postponed to the next year to be amended. It was evident from the commencement that to be a success the journal must be an illustrated one; but he was afraid that in these extravagant times the form of the illustrations would not appeal to the average reader of an architectural journal, they being generally of a somewhat scrappy nature. One number broke out with two full-page plates of a marvellous composition for a monument to the Duke of Sussex by Joseph Hanson, and another full page plate was that of the Infant Orphan Asylum at Wanstead, by Messrs. Scott and Moffett. The design was Elizabethan, far in advance of most of the work at that time, and fully justified the expectation that the authors would at a later date become eminent, as was certainly the case with the senior partner. At this time, St. Giles's, Camberwell, and the Martyrs' Memorial, Oxford, were in progress, and were more than once referred to in laudatory terms. A most ambitious design for the Washington Memorial, New York, of the worst type of the so-called Gothic, caused a sensation amongst the editor's correspondents. The illustrations were very unequal in quality, both in subject and execution. There were cottages of all descriptions, wooden houses of all shapes and sizes, and a Gothic greenhouse. The planning of some of the designs was extraordinary, while the elevations were beyond description. It was a plucky individual who would send a design, as it was no sooner published than a host of very candid critics made their appearance. As a contrast there were two delightful small outline engravings in No. 9, of the exterior and interior of St. Mary Redcliffe, Bristol, to illustrate the restoration by Messrs. Button and Hoskings, Button being the veteran author, while Hoskings was Professor of Architecture at King's College. Many of them had doubtless noticed the very gorgeous stucco fronted house in Princes-street, Hanover-square. In this volume they were treated to an illustration of it as a recently completed building, and found that it was built by a Mr. Fair, a house decorator, for his own business. The editor described it as "a sort of licentious indulgence of the fancy," but it was rather refreshing at this date to find him both here and in a subsequent reference arguing for plaster treatment, and not an imitation of a stone building. Another interesting, if extraordinary, subject was a design for a house built of mud, in a style a cross between Gothic and Egyptian, and this the editor described as being "a notable instance of the perversion of every principle of sound taste." On the opposite page was a good outline engraving of the Scotch Church, Crown-court, Covent-garden, and it was interesting to find that this was a mere refronting of an ugly existing building. An illustration of the Military Chapel, St. James's

Park Barracks, was presented with the supposition that it "will provoke the bile in our Gothic fanciers, and at best find but few defenders." With regard to the Royal Exchange, it was clear that competition scandals were not the product of modern times only, both from this and other examples given. Mr. Davis then explained how Mr. Tite pulled off the job, and a writer in the *Builder* was rude enough to allude to the design as being "of the venison and turtle style of architecture, for the mouldings and enrichments of the various fronts are fat and bulky." To them as members of the Association the articles and letters respecting the lately organised "British Association of Architectural Draughtsmen," the precursor of the Architectural Association, was of supreme interest. The *Builder* proposed founding a school of art instruction for drawing, mensuration, modelling, etc., but the scheme fell through. The *Builder*, however, hailed with pleasure the B.A.A.D. and concluded the article by saying, "We are their humble servants in the promotion of this or any other end of their honest ambition." There was a still closer connexion between the *Builder* and the B.A.A.D., for the paper very generously published drawings for assistants, partly with the object of obtaining situations for the contributors. In No. 34 an interesting statement was given of the cost of the Houses of Parliament building. There was an interesting description by Barry of his proposed decorations, and the *Builder* rejoiced in the fact that there was a prospect that "architecture, sculpture, and painting are at length once more to be allied." A view of the completed British Museum by Sir Robert Smirke was given, and was severely criticised by both the Editor and various correspondents. A rather severe classic design for the new Town Hall, Colchester, was given in No. 13, and they were surprised to find that the architects were Mr. Raphael Brandon and Mr. Blore. Probably this was before Mr. Brandon became such a pronounced Gothicist. The FitzWilliam Museum at Cambridge, and St. George's Hall, Liverpool, were mentioned as works in progress, the latter being described as "the most chaste, classical, and perfect specimen of modern architecture which we have as yet seen." Pugin, although but thirty-one years of age at the time, was freely discussed in the volume by admirers and others, and St. George's Church was mentioned by the *Builder* as an example of what a church should be. They read of Professor Donaldson taking the chair at a meeting of the R.I.B.A., at which a paper was read on church building by Geo. Godwin, who afterwards edited the *Builder*; of Edmund Woodthorpe, District Surveyor and father of one of the present members of the A.A.; of Brunel the engineer; of J. B. Waring; of John Everett Millais, H. B. Garling, and E. B. Stephens, who gained medals respectively for painting, architecture, and sculpture at the R.A.

Mr. Davis proceeded to deal with some of the building materials advertised and referred to in the volume, and said, of all the new inventions of time, few, if any, attained such permanent importance as the practice of galvanising. There was no doubt that the *Builder* commenced an era of journalism, from which they all reaped benefit. It was only necessary to look at the twelve pages for 3d. and compare it with what they now got for 4d., even if only in illustrations, for them to be very lenient to the architectural student of sixty years ago, when they compared his work with that of the student of to-day.

Mr. Trotman proposed a hearty vote of thanks to Mr. Davis, and referred to the changes which had taken place in the *Builder*. Whether all the changes which had taken place were to its advantage, and whether the *Builder* had advanced with the times, was another matter. The paper was first started apparently for builders, and now he supposed it was an architect's paper. A builder a few days ago was telling him how badly the trade was served with papers, and said, "In fact we have no paper that we can call a builder's paper." It was a matter for regret to many old buildings had been pulled down to make room for such erections as Queen Anne's Mansions and the Hotel Cecil, and abominations of that kind, and there really seemed no excuse for offence against taste in the erection of this sort of building. He often thought it would be better if the *Builder* had its drawings reproduced in clear black and white line, in preference to ink photos of wash drawings, some of them were very smudgy. But the *Builder* had from time to time given them some splendid work—notably the drawings of the late Mr. Brewer and many noted architects. He supposed they could not expect to get such drawings week after week for 4d., but if the proprietors could not give them something decent every week that was actually being erected, they might give photos of old buildings. It seemed to him that the American papers reproduced their drawings much better than the English journals.

Mr. Trant Brown, in seconding the motion, said that it always struck him as curious that its name should be the *Builder*. The first volume evidently showed the difficulty the proprietors had in finding their feet. He felt that a great deal was to be gained from studying the back volumes of the *Builder*, and seeing the first illustrations of buildings which were now, comparatively speaking, old. One saw the change which had taken place in what he might term the architectural schools. In going through the country he found a really large amount of excellent work, none of which seemed to have found its way into the London architectural papers. How was it that the illustrations in the *Builder* were, for the most part, confined to London work, or work done by London men, whereas they found in many provincial cities work fully equal to, and in many cases beyond that which was illustrated.

Mr. A. Belcher said that for his part, the *Builder* seemed to be at its highest platform at this time, but he would like to see one page of illustrations of old work given every week, of cathedrals, abbeys, or old mansions.

Mr. R. H. Weymouth said it must be remembered that many rivals had entered the field, and as each paper got a *clientèle* of its own it must make it harder for the premier building paper of the day to get all the illustrations it would like to. He would like to see more working drawings of buildings, but as the Editor said when he last published them, they were rather hard to get.

Mr. L. Ambler referred to the criticisms and correspondence on designs in the first volume, and said he was rather glad that did not happen now. He was interested to hear of the Builders' Institute, of which Mr. Hanson seemed to be the director. With regard to what had been said, he thought they had only to look at any volumes of the *Builder* to see a great many old buildings, and sometimes nearly a whole number was devoted to drawings of old buildings by successful students. He knew, as a member of the Architectural Sketch Book Committee, that often they had to decide whether they would have beautiful drawings because the same things had appeared in the *Builder*. As regarded the provinces, he went about a good deal, and he had seen a great many provincial buildings illustrated in the *Builder*.

Mr. W. E. Wonnacott said it had struck him how enormously all technical journals had gained by the invention of photography. He felt, however, that if they stuck more to black ink in reproducing drawings it would be better.

Mr. J. S. Gibson, Special Visitor, said that some of the correspondence in the earlier numbers was most amusing, and an interesting fact was that the eternal question of competition was in existence then as now, and probably would be until the end of the chapter. Another interesting item was the information given regarding the British Museum design by Sir R. Smirke. That was of double interest, because the Government were now contemplating extending the Museum, and the Institute was engaged in the laudable attempt to secure that the work should be intrusted to some architect of sufficient eminence to complete it in a manner worthy of the State and the Institution. Had Mr. Statham been there he was certain he would have enjoyed the paper and discussion, and would have had his eyes opened to the extraordinary amount of incipient talent of those who would give him suggestions how to conduct an illustrated architectural paper. To his mind, even a paper so long established as the *Builder* had to keep pace with the times, and if possible to get ahead of them, and a comparison between the *Builder*, as representing the best that could be done in England, and the American journals was a perfectly fair and just one. There was no doubt that the best of the American papers were miles ahead of the best British papers in the quality of illustration. The suggestion for weekly illustrations of old buildings was an admirable one, but the *Builder* had done this to a considerable extent, and one of the things that paper could pride itself on was its series of cathedrals done by a whole galaxy of admirable draughtsmen. He would also advocate very strongly that the *Builder* should illustrate the finer plates from some of the rare architectural books, which many young architects would never be able to see otherwise. He thought builders ought to read the *Builder* as much as architects, for it contained really up-to-date information for their benefit.

The vote of thanks having been heartily agreed to,

Mr. Davis briefly replied, and said that with regard to the title, about halfway through the volume it was suggested that it should be called "The Builder and Landscape Gardener," and towards the end of the volume someone suggested that it should be called "The Architect." As to the illustrations, he personally regretted the passing away of the fine old wood engravings. As to the American journals, it must be remembered that they cost a great deal more than the English journals. He agreed with Mr. Ambler that in going about the country he came across a great many buildings he was familiar with by having seen them in the *Builder*. There were two Hansoms mentioned in the volume—Charles and Joseph. He believed that one of them was editor of the *Builder* for some time. One thing they could congratulate the *Builder* upon was the entire absence of advertisement in the ordinary matter—they never found "puff" articles.

ARCHITECTURAL SOCIETIES.

GLASGOW INSTITUTE OF ARCHITECTS.—The annual general meeting of this Institute was held on the 6th inst. in the rooms, 187, Pitt-street, Mr. Horatio K. Bromhead, F.R.I.B.A., President, in the chair. The Secretary read the thirty-sixth annual report, which stated that during the past session Sir James Guthrie, President of the Royal Scottish Academy, was added to the roll of honorary members. The number of ordinary members on the roll is now seventy-three. The President, in moving the adoption of the report, said that one of the most important improvements for the profession to which he looked forward was the openness and publicity of competition. They were indebted to the Corporation of Glasgow, who had been most successful in obtaining, by competitions, a number of good designs for public libraries. This was a great contrast to the Royal Infirmary competition. On a recent occasion the Lord Provost said that the design which the Governors were proposing to adopt had been submitted to their officials, who had indicated some details which it was thought required improvement. They might therefore conclude that there might at last be a dawning idea at headquarters that a grievous mistake had been made in casting out the designs that were pronounced the best, and in refusing to submit the inferior favoured one to public daylight. If he had not seen the front elevation of the chosen design, it would have been his opinion that any new building might have a better appearance than the old one. But the proposed sky-scraper could only be considered a calamity to the most venerable specimen of architecture in Scotland, the Cathedral. If it were for the public good, feelings might be stifled, but when it was known that the most modern and perfect ideas were dead against it, when one saw that the most remarkable modern hospital (Belfast) was only one story high, and the intended new building at Birmingham was to be only two stories high, one could not help seeing the ill-advisedness of spending a large sum of money after the manner of a bygone generation. However, the Institute might have a little comfort in the hope that their action had produced a limited modification of the defects. Looking ahead, there appeared to be a little cloud arising at their horizon, in the unfortunate tendency to divide the profession into two parties. On the one hand there were architects who seemed to want to make out that art was everything, and who struggled to get elected into some art atmosphere, which they possibly imagined was superior to architecture, where they could ignore business capacity and practical knowledge by employing skilled specialists to do the real work for them. On the other hand, they saw men who were content to make their work practical and businesslike,

whose skill enabled them to use materials in a sensible and economical manner, but with little thought of suppressing what was ugly. From this point of view, the recent agreement between the School of Art and the Technical College, to confine the art teaching of architecture to the School of Art, and the constructive and scientific branches of architecture to the Technical College, was quite a disaster. The antidote was, however, in the air in the shape of statutory registration of architects, which had become the question of to-day. He hoped this would lead both sides to see that the happy medium was a combination of both ideas. The motion was adopted. The Council for the ensuing year was elected as follows:—Messrs. David Barclay, A. N. Paterson, John Keppie, Horatio K. Bromhead, James Lindsay, T. L. Watson, James M. Monro, Alex. M'Gibbon, Andrew Balfour, W. J. Boston, Charles Gourlay, J. A. Campbell, Thomas Baird, jun., R. D. Sandilands, James K. Hunter, and J. M. Crawford. The Treasurer's accounts, which were submitted and approved of, showed that the funds were in a satisfactory position. A meeting of the newly-elected Council followed, at which office-bearers for the ensuing year were appointed, viz.:—President, Mr. John Keppie, F.R.I.B.A.; Vice-president, Mr. James M. Monro; Auditor, Mr. David Barclay, F.R.I.B.A.; Secretary and Treasurer, Mr. C. J. MacLean. The various committees for the year were also appointed, including Committees on Public Architecture and on Architectural Education, etc.

DIAGRAMS OF "DRILLIBITE" APPARATUS.

THESE three diagrams show two forms of the tool called "drillibite," the objects and operation of which were described at some length in an article in our issue for November 21, 1903, p. 519.

Fig. 1 is an elevation of the apparatus arranged for operating upon a horizontal or approximately horizontal surface, such as a floor, a ledge, or rock, in a tunnel or any excavation.

Fig. 2 is the plan of the same apparatus.

Fig. 3 is an elevation of the apparatus arranged for operating upon a vertical or approximately vertical surface, the drill holder or cylinder being carried by a spreader bar.

ENGINEERING SOCIETIES.

SOCIETY OF ENGINEERS.—At a meeting of the Society of Engineers held at the Royal United Service Institution, Whitehall, on the 11th inst., Mr. D. B. Butler, President, in the chair, a paper was read on "The Latest Practice in Sewage Disposal," by Mr. H. C. H. Shenton, of which the following is an abstract. The author first pointed out that the practical engineering side of the question of sewage disposal as distinguished from the theoretical side had not received the attention it deserved in papers read on the subject. He then briefly reviewed the present methods of sewage disposal in the following order:—Natural and artificial precipitation, upward filtration, and the septic tank system, all for the removal of sludge; broad irrigation, lateral filtration and downward filtration, on land; the fine filter, the washed-out filter, the contact bed, and the continuously aerating filter. He stated that a careful examination of existing works throughout the country led him to the conclusion that each and all of the foregoing systems had their uses, and produced good results in certain cases. The biological methods, he said, included every recognised system of final sewage purification.

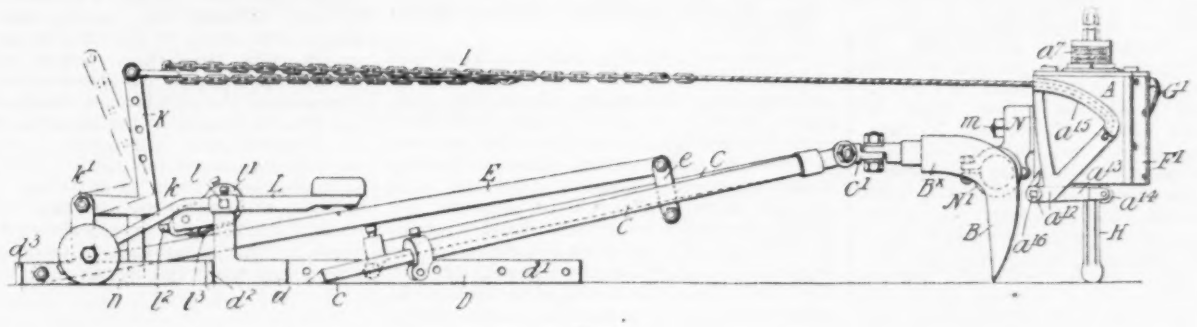


Fig. 1.

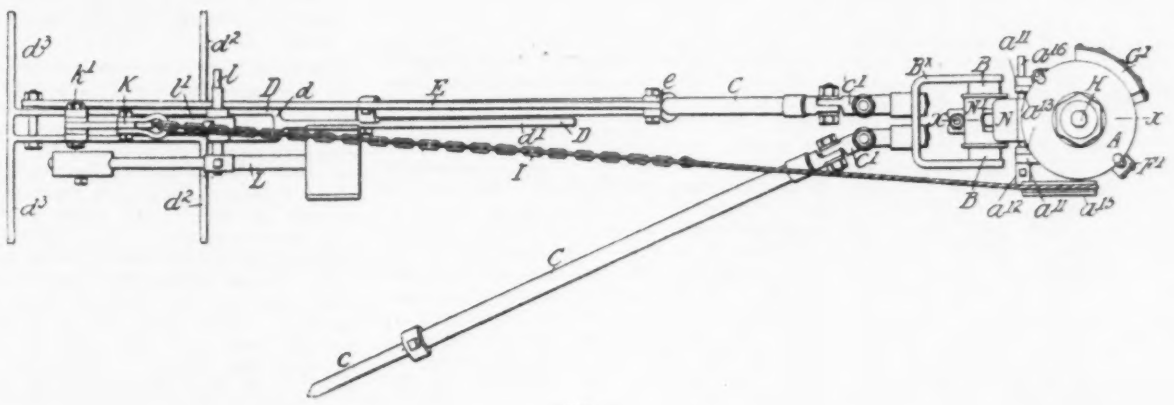


Fig. .

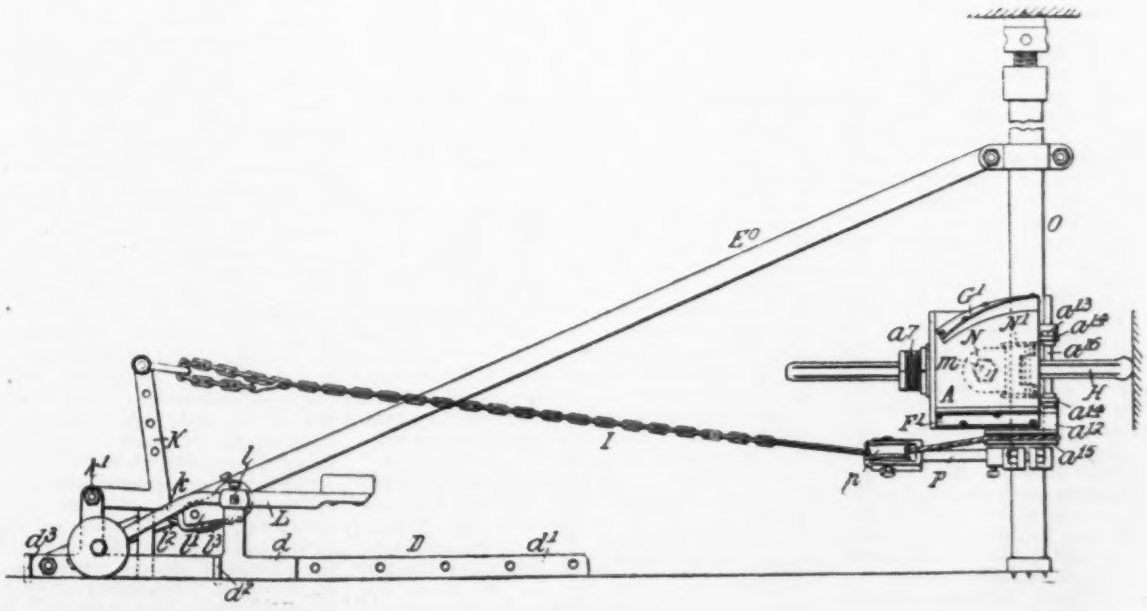


Fig. 3.

Diagrams of "Drillibite" Apparatus.

Some of the details of construction of septic tanks, contact beds, and continuously aerating filters were then described. The absolute importance of proper construction in order to give theoretical principles fair play was insisted upon. Failures were often due either to bad design or construction or to careless working, and not to any mistake in principle. The contact bed and the continuous filter were compared; their depths were discussed, and also their practical advantages and disadvantages. Methods for overcoming the latter were suggested, which were, briefly, to keep the outlet of the septic tank at a sufficiently low level, to intercept sludge which by any irregular working passes out of the septic tank, to allow *humus* to wash out of first contact beds and to intercept it on the surface at the second beds, to catch the *humus* washed out of the continuously aerating filters in pools, channels, or on fine filters. The Dibdin bed of tiles and slates, designed to do the work of the septic tank, and the multiple contact system for places where the fall of the land is very slight, were referred to. In conclusion the author observed that, to his mind, the differences of opinion on the subject of sewage disposal was more of a theoretical than of a practical nature.

THE JUNIOR INSTITUTION OF ENGINEERS.—At the meeting of this Institution held at the Westminster Palace Hotel on the 8th inst. the Chairman, Mr. Samuel Cutler, jun., M.I.Mech.E., presiding, a paper on "Heating and Ventilating Small Workshops" was read by Mr. Kenneth Gray, M.San.Inst. Member. Employers of labour, he said, are beginning to pay attention to the ventilation and warming of their shops. Experience shows that, apart from the benefit which the employees derive from healthy and comfortable surroundings, a real economy is effected where a large quantity of fresh warmed air is continually passing through the shops. The breathing of impure air, charged to excess with carbonic acid, and laden with all kinds of animal, vegetable, and mineral impurities, greatly reduces the bodily vigour of the workpeople, and so contributes to slackness. It is unreasonable to expect that they can perform hard and arduous work when the air they have to breathe is such that they cannot obtain from it the nourishment which their exertions demand. A close investigation of the changes which take place in air in the process of breathing seems to show that expired breath, although at the moment of leaving the lungs no doubt tends to rise, yet is probably rapidly cooled, and, being a heavier mixture than fresh air, falls again almost at once. The fact that air at 32° F. is raised through 60° F., although in contact with the lungs for but two or three seconds, shows how rapidly its temperature is changed. And, as in breathing out, it is emitted through the nostrils in a downward direction in two attenuated streams, it seems probable that an equally rapid cooling takes place. Under these circumstances, if the ventilating outlet registers are placed near the floor level, and the fresh-air inlets above head level, and some mechanical power is used to drive the air into the shops, a continual stream of fresh air will be passing into the building, while the expired vitiated air is safely carried away through the extraction shafts. With all systems of ventilation it is necessary to provide means to warm the incoming air, and it seems advisable to do this while it is passing through the main duct leading to the shops. But it is a good plan not to heat the air to a high temperature; there are many reasons why it is advisable to heat it only to the same temperature as that which it is intended to maintain in the shops. The warming of the shops can best be secured by direct heating, *i.e.*, the fixing of the radiating surface inside the various shops. Where appearance is not of such importance as economy of space, this can be effectively done by fixing hot-water or steam pipes above head level. The only difference this makes in warming a building is that it takes rather longer to raise the temperature than when the pipes are fixed on the floor level; but as soon as the required temperature is reached it can be just as easily maintained. Rules and tables for calculating the required amount of radiating surface were given and fully explained, particular attention being called to the influence that the material of which the building is constructed, and the extent to which it is exposed to the cold winds, has upon the amount of radiating surface necessary.—Messrs. W. G. Wernham, Percy Young, J. H. Pearson, A. W. Marshall, T. C. Morewood, R. Marshall, G. T. Bullock, G. C. Allingham, J. N. Boot, J. W. Nisbet, and the Chairman took part in the discussion which followed, and much interest was shown in the relative merits of mechanical and natural ventilation, and the plenum and extractum systems. The author, in his reply, discussed these questions fully, pointing out that the large air change necessary in ventilating a crowded room represented a surprisingly great amount of mechanical work, which is far more than the difference of internal and external temperature could be relied upon to perform, especially when this difference was not great and the atmosphere was still; he therefore recommended some mechanical means to make sure of air change. With regard to the plenum and extractum systems, each had its merits, and good work could be done with both; everything depended on the design and erection of the apparatus.

Books.

Roman Hayling: a Contribution to the History of Roman Britain. By TALFOURD ELY, D.Lit., M.A. (Lond.), F.S.A., etc. London: Taylor and Francis. 1904.

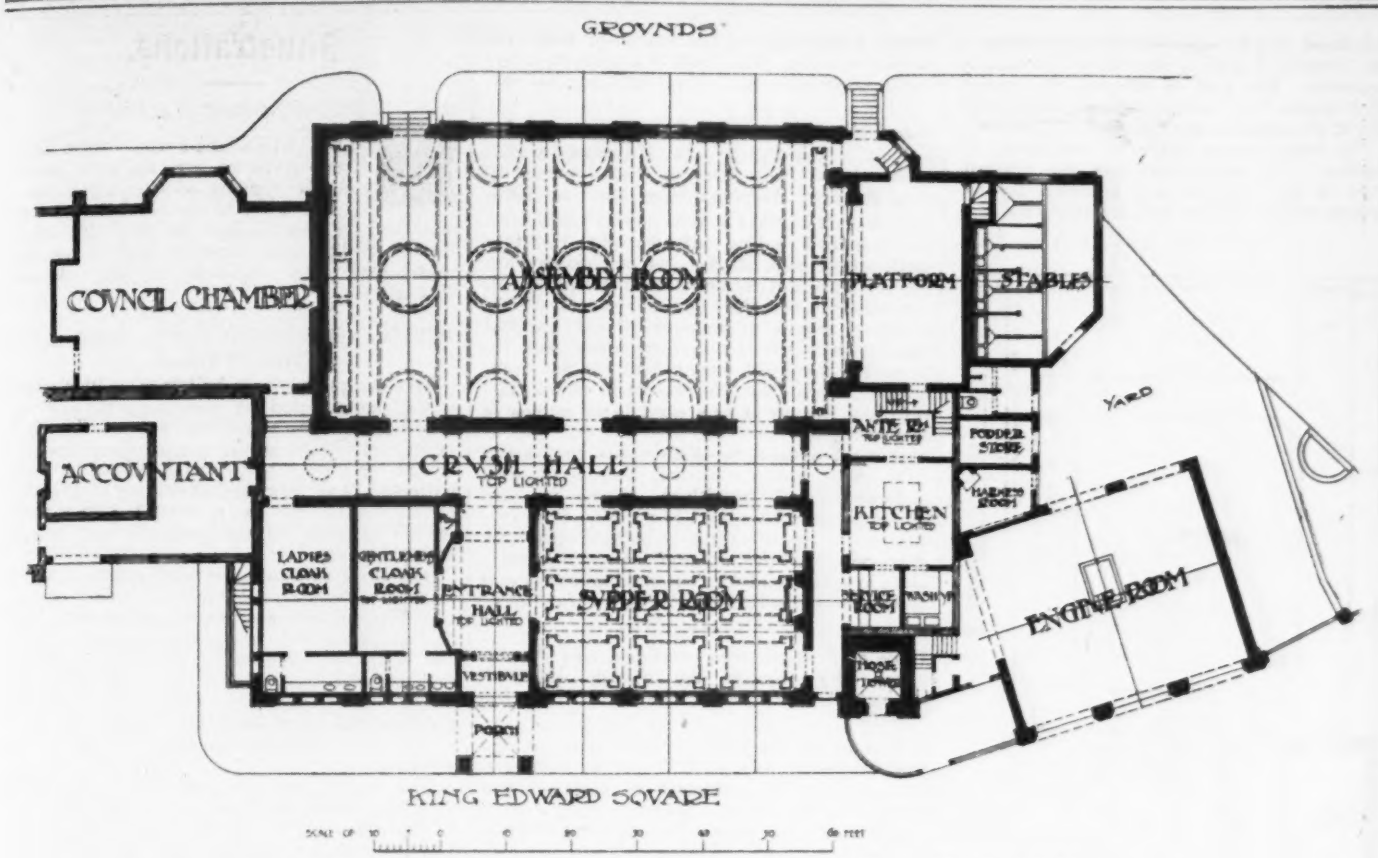
A COUNTY which includes Calleva or Vindonum (Silchester), the Venta Belgarum of Scapula and Carausius (Winchester), Clausentum (Bitterne), the villas at Brading and Carisbrooke in the Isle of Wight, and other similar remains, to which we can now add those in Hayling Island, may justly claim to take high rank amongst those which visibly illustrate the Roman occupation of Britain. In this volume Dr. Talfourd Ely publishes his thesis for the degree of Doctor of Literature, describing, with views and a plan, the results of excavations he made, with his own unaided hands, during the interval 1897-1903, in the extreme south-east corner of the county of Southampton, where, moreover, there is still much more to be explored. Hayling Island, which consists of the two parishes of North and South Hayling, in Bosmere hundred, situated between Langston harbour and the Emsworth channel of Chichester harbour, formed a portion of the country of the Regni tribe of the Belgæ when Vespasian and his second, or Augustan, legion subdued for the Emperor Claudius that part—called Britannia Prima—of England. The scene of Dr. Talfourd Ely's explorations is a field of formerly common-land about twenty acres in extent known as the "Towncil Field" in the northern parish. He had observed that the ground on its eastern side gradually rose above the general level; coins had been ploughed up there and fragments of broken walls had been taken for the repair of roads in the neighbourhood. His labours were rewarded by the discovery of the eastern end of a building having an apsidal projection on that side and measuring, so far as one could judge from the appearances above ground, about 131 ft. from east to west by 63 ft. in width. The first portion he exposed is built up of flints and dressed blocks of hard chalk "about 6 in. square"; he also traced for some distance three walls that are 2 ft., 2½ ft., and 3 ft. thick respectively, and found considerable quantities of shells, rough pottery, etc., with scattered tesseræ indicative of the propinquity of a mosaic pavement. His researches in 1898-9 revealed the massive foundations, their breadth increasing from 3 ft. at the two ends to 10½ ft. in the middle, of an outer eastern wall of what he suggests was a barbican or beacon-tower, from which the sea is now distant only half a mile in all directions—the south excepted. Along the inner side of that wall lies a space, from 7 ft. to 8 ft. wide; on the western side of that space, and extending as far again northwards, lies the eastern wall of a rectangular enclosure 134 ft. by 143 ft., within which are the remains of a house planned after the "courtyard," as opposed to the "corridor," type and heated with horizontal flues beneath the floors—a method which the late Professor Middleton averred is peculiar to Britain. Within the enclosure is a circle of stone nearly 5 ft. thick, and having an interior diameter of some 37 ft., of which the precise purpose is not clear. To the extrinsic value of a *dupondius* of Domitian which he dug up Dr. Talfourd Ely attaches much importance. The inscription, "IMP. CAES. DOMIT. AVG. GERM. COS. XVII. CENS. PER. P.P.," on the obverse of the coin, which is but very little worn, testifies that it was struck when Domitian (whose title of "censor perpetuus" was, Dio says, peculiar to himself) was consul for the seventeenth time, that is to say, in A.D. 95. That circumstance, considered together with the character of the pavements, the total absence of the usual pilæ of stone or tile as found at Silchester and Caerwent, and other indicia, warrants the assumption that in Hayling Island we have evidence of a Roman settlement made less than fifty years after the subjugation of South-East Britain in the reign of Claudius by Plautius and Vespasian, and when the passage from Vectis was much shorter than it is now, much of Hayling Island having been since absorbed by the advancing sea.

Littlehampton and Arundel, with their Surroundings. By W. GOODLIFFE, M.A., late Scholar of Corpus Christi Coll., Cambridge. London: The Homeland Association.

THIS is neither a guide-book nor a learned treatise, but just a simple account of the villages and towns which are contained in what is called the "Rape of Arundel." Mr. Goodliffe takes each village in turn, beginning at those south-east of the river Arun and working round again to the north-east. There is abundant material for him, for nearly every hamlet owns a church that is noteworthy by reason of its age or some architectural peculiarity, besides many old houses with which curious legends are connected. For many of the architectural details the writer has availed himself of the notes taken by Mr. P. Johnston, who has made a study of the ancient churches of the district, including that with the Saxon tower at Sompting. Many of the beautiful walks are sketched out, taking either Littlehampton or Arundel as a starting-point, so that a stranger to this part of the country can easily find his way.

Disinfection and the Preservation of Food. By SAMUEL RIDEAL, D.Sc., F.I.C., F.C.S., etc., author of "Water and its Purification," etc. London: The Sanitary Publishing Company. 1903.

ALTHOUGH there is no intimation of the fact on the title-page, this is really the third edition of Dr. Rideal's book. The whole of the work has, however, been revised, and some new matter added to bring it up to date. By far the larger portion is devoted to the subject of disinfection; out of sixteen chapters and 494 pages only one chapter of twenty-eight pages deals specially with the preservation of food, but the subject is also incidentally discussed in other parts of the book. In an introductory chapter Dr. Rideal points out that the destruction of pathogenic bacteria "is the office of real disinfectants," and that *heat* is the most important agent for effecting this object. "Mechanical Disinfection" is the somewhat misleading title of the next chapter, which contains an account of the effect of light and other rays on bacteria of various kinds, and also passes in review a number of materials, such as charcoal, peat, infusorial earth, sand, etc., which are used for the purification of gases and liquids; filters of different types are briefly noticed, and also the effects of cold and desiccation. Of greater practical utility is the chapter on "Sterilisation by Heat," in which the author compares some of the most important apparatus in which hot air and steam are employed for purposes of disinfection; he confirms the general opinion that steam is more efficacious than dry air, and shows how the condensation which is one of the drawbacks of this agency may be obviated. Illustrations are given of steam-disinfectors used in this country and in Austria, France, Denmark, and Germany. Architects engaged in the construction of hospitals and sanatoria will find this chapter particularly valuable. Eight chapters, constituting rather more than one-half of the book, deal in detail with chemical disinfectants of nearly every kind, and are followed by a chapter on "Practical Methods," which is of more general interest. The author shows the futility of some of the methods commonly adopted, such as the occasional sprinkling of gullies with disinfecting powder, the placing of saucers containing disinfectants in bedrooms, the hanging up of sheets dipped in disinfectants, and fumigation by medicated lamps or candles. On the subject of fumigation by sulphur the author is not quite so explicit; he gives the opinions of a number of authorities for and against the process, but does



New Town Hall and Fire Station, Sutton Coldfield. Plan. (*See page* 414.)

not give the reader much assistance in deciding between the rival views. Our own opinion is that the value of sulphur fumigation has been very much over-estimated; if it is properly done it will kill fleas and bugs, but bacteria and the spores of bacteria are not so easily exterminated.

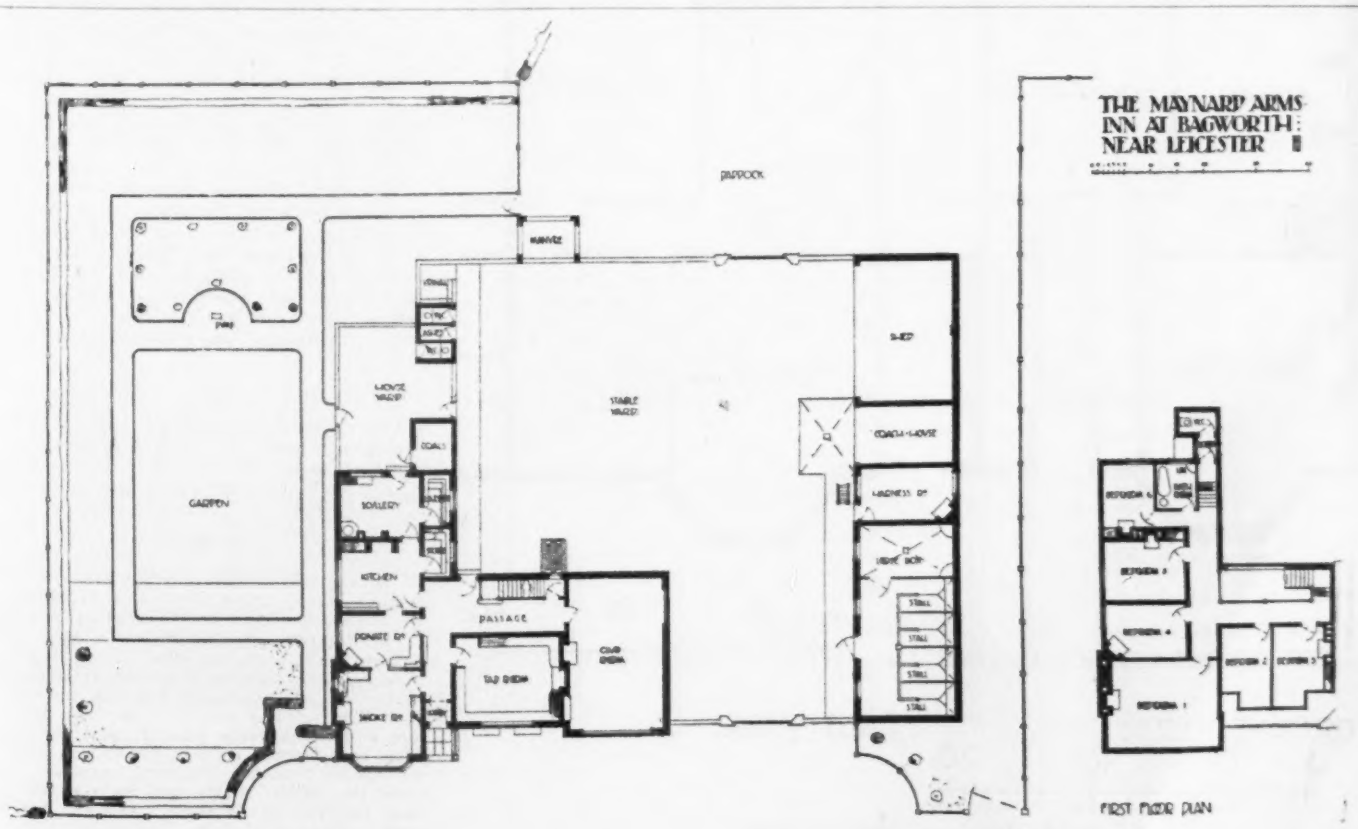
"Personal and Internal Disinfection" is the subject of another useful chapter, and "Legal Statutes and Regulations" are also considered. In this cursory notice we have only briefly mentioned a few of the most important features of Dr. Rideal's extremely valuable and interesting book.

The Law of Boundaries and Fences. By ARTHUR JOSEPH HUNT. Fifth Edition, by Henry Stephen, Barrister. London: Butterworth and Co. 1904.

HUNT'S Law of Boundaries and Fences has now reached so safe a place as a standard work that it is unnecessary to do more than notice the issue of a new edition, which is smaller in size than the fourth edition. There are also some improvements in the manner of printing which render the book more easy of reference. Altogether it would not be easy to find a book more useful both to laymen and lawyers.

Up-to-date Tables of Imperial, Metric, Indian, and Colonial Weights and Measures, etc. Compiled and written by ALFRED J. MARTIN, F.S.I. London: T. Fisher Unwin, 11, Paternoster-buildings, E.C. 1904.

THIS little book of about 250 pages contains a large amount of useful and interesting information on the weights and measures, moneys, etc., in general use throughout the most important parts of the British Empire, but its principal purpose is to advocate the adoption of the metric system. The author suggests what he considers to be the simplest methods of effecting the change, and states the advantages and disadvantages which it would involve in all the principal industries; he also advocates a number of modifications of the French system, in order to render it more suitable for British use. That the country is ripening for the change is clearly shown by the recent debate on the subject in the House of Lords, when politicians of both parties spoke in favour of it. All business men are agreed that an enormous amount of labour is wasted in the arithmetic of our current weights, measures, and money, and that a simpler system would eventually prove a boon, but many shrink from the initial worry and labour which the compulsory adoption of the metric system would entail. To all these Mr. Martin's book can be recommended; it will dissipate many of their fears, although, on the



other hand, it may aggravate the opposition of some interested parties, especially the railway companies. The cost of effecting the change will, however, be a serious matter in the present state of the national finances, and will probably be the most potent factor in postponing its adoption; the substitution (by the Government) of new weights and measures for old throughout the country will not be such a profitable transaction as the exchange made for Aladdin's lamp. The book is a mine of interesting information and of valuable suggestions.

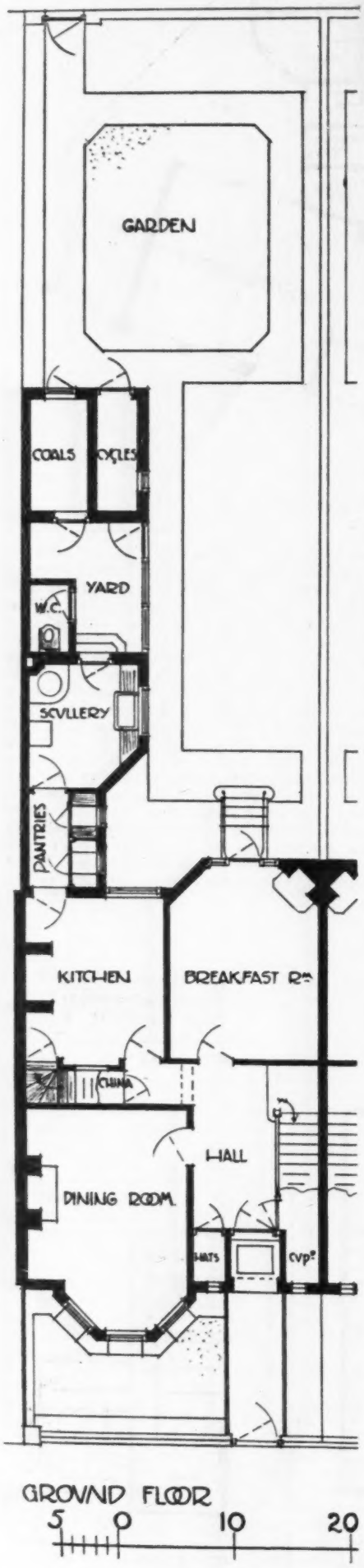
Calculating Tables and Collection of Frequently-Used Numerals. By DR. H. ZIMMERMANN. Translated from German into English by L. Descroix. London: Asher and Co. 1904.

IN this book we have a collection of simple and easily-applied tables intended to facilitate arithmetical calculations. As our readers are aware, this object can be attained by logarithms, the slide rule, and other devices; some of which, however, require an amount of mathematical knowledge which is not always possessed by those requiring aid, and others are not sufficiently accurate for the objects in view. The principal feature of this work is an extensive multiplication table with notes at the foot of each page, giving squares and cubes, square and cube roots, areas of circles, lengths of arcs, reciprocals, and logarithms. There are also a table of factors for the odd numbers from 1 to 999, and a table of various important constants. After perusal of the explanations and directions given in the introductory chapter, anyone should be able to use the tables with ease and rapidity.

Table of Multiplication, Division, and Proportion. By ROBERT H. SMITH, M.I.M.E. London: Archibald Constable and Co. 1903.

THIS is a large sheet folding up into two covers and containing 100 multiples of all numbers, from one to 160, arranged in tabular form for getting results at a glance. On the back are a number of memoranda as to principles of calculation, etc. Its special object is to simplify calculations as to quantities, costs, estimates, wages, and wage premiums. It folds up into a compact form, and is mounted on calico. The memoranda on the back contain a great deal of useful information and suggestion.

ST. ANDREW'S PARISH CHURCH, NEWCASTLE.—It has been decided to add vestries to this church. The work, which will be carried out from the designs of Mr. Hicks, architect, will be executed in stone.



Houses, Fosse-road, Leicester. Plans.

Illustrations.

TISSINGTON HALL.

ALTERATIONS and restorations have been going on here for some years. A plan showing what additions were to be made to the old building was published in the *Builder* on May 18, 1901. Messrs. Walker and Slater, of Derby, are the contractors. The architect is Mr. Arnold Mitchell.

SUTTON COLDFIELD TOWN HALL AND FIRE STATION.

THE design for these buildings as illustrated is the one selected by the Town Council for erection, and is a modification of the first premiated design in the competition, the fire station and hose tower being added in their entirety. The awkward character of the site for the fire station also necessitated alterations in the planning of the platform end of the assembly-room.

The main buildings are principally one story in height, the supper-room being placed on the ground floor, as being most convenient for use in connexion with the assembly-room, either for light refreshments at a buffet, suppers, or letting for small dances.

The fire brigade is a voluntary one, and there were, in consequence, special requirements which governed the planning of the fire station

The character of the work both outside and inside has been kept as simple as possible.

The existing council house adjoins the new buildings, from which it is quite distinct.

The architect is Mr. Arthur R. Mayston (of Messrs. Mayston and Eddison), London.

MAYNARD ARMS INN, BAGWORTH.

THE Maynard Arms Inn was built at Bagworth, a village near Leicester, for Messrs. W. Everard and Co., of Leicester, at a total cost of 2,781*l*. The walls are finished externally with rough cast. The roofs are all covered with old Swithland slates. The work was carried out by Mr. Walter Moss, of Coalville, under the supervision of Messrs. Everard and Pick, of Leicester.

HOUSES, FOSSE-ROAD, LEICESTER.

THE two houses on the Fosse-road, Leicester, were erected a few years ago for Mr. Henry Flude, at a cost of 2,300*l*. The facing bricks used are Woodville sand bricks, the work being carried out, under the supervision of Messrs. Everard and Pick, by Mr. F. Elliott, of Leicester.

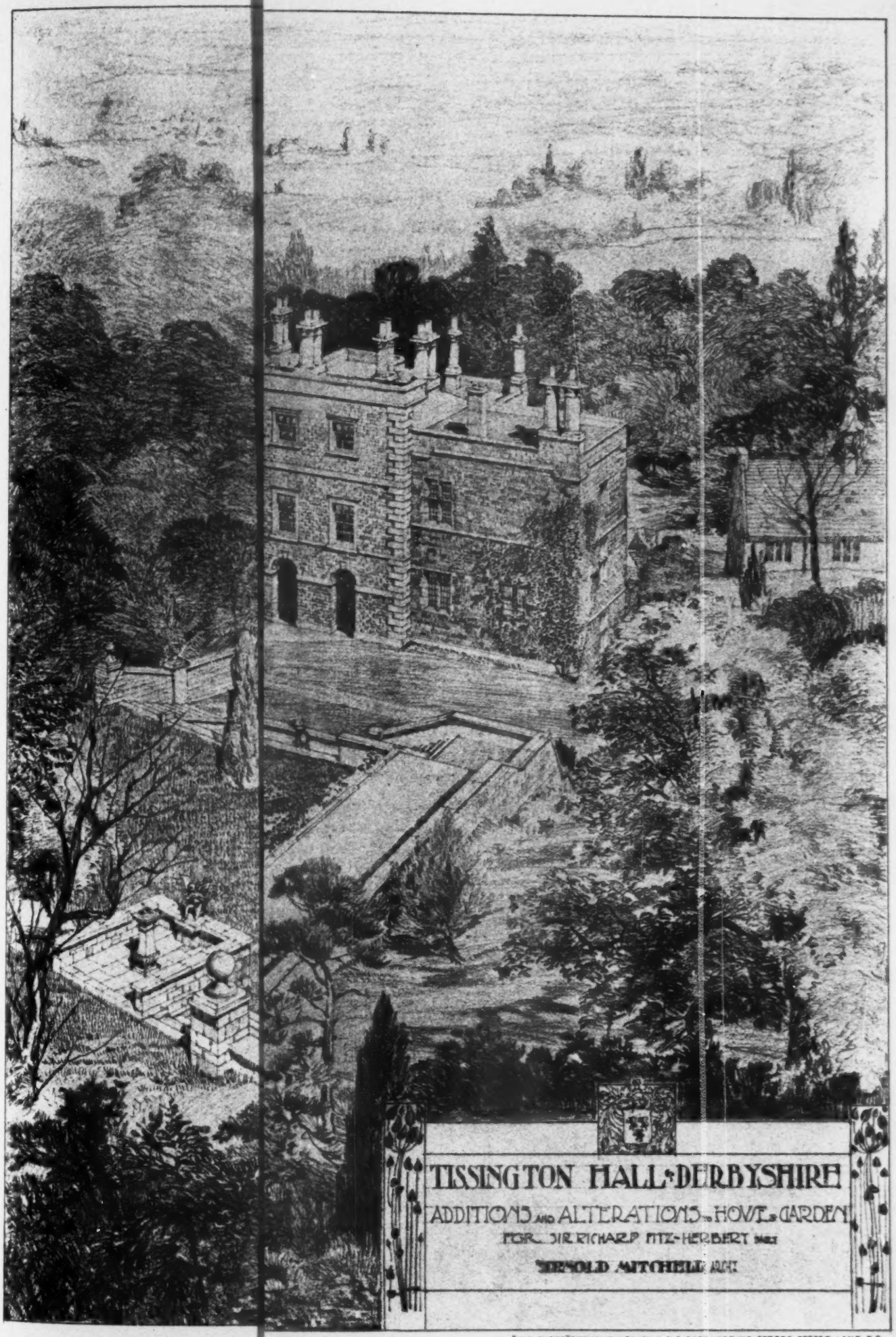
OFFICES, ST. MARTIN'S EAST, LEICESTER.

THE offices in St. Martin's East, Leicester, were erected for Messrs. W. Cecil and H. B. Harris, solicitors, and overlook St. Martin's Churchyard. The major portion of the brickwork used on the front is that taken from the old building. The cast leadwork is from plaster models in low relief, the ground work of panels being tinned. All the joinery is in Kauri pine left from the plane, with the exception of that on the first floor, which is in oak. The cost of the works was 1,540*l*. The builders were Messrs. Henry Herbert and Sons, of Leicester, and the architects Messrs. Everard and Pick.

ORPINGTON CHURCH.

THE views of the exterior and interior of Orpington Church are given as illustrations to the first article in this issue, in which the history and architecture of the church are fully described.

UNIVERSITY COLLEGE, LONDON.—A course of ten lectures on "The History of Architectural Development" is to be delivered by Professor F. M. Simpson at University College. The lectures will begin on Friday, April 22, at 11 a.m., and, judging from the syllabus, the course will be an interesting and instructive one. The lectures will be illustrated by lantern slides, diagrams, photographs, and casts. After each lecture, from twelve to one, students will sketch from the diagrams, casts, etc., and from the slides, which will be repeated, or visit the British Museum. The fee for the term's course is 1*l*. 1*s*.



TISSINGTON HALL · DERBYSHIRE

ADDITIONS AND ALTERATIONS TO HOUSE & GARDEN

FOR SIR RICHARD FITZ-HERBERT BART

ARNOLD MITCHELL ARCHT

"INK-PHOTO" SPRAGUE & Co LTD 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

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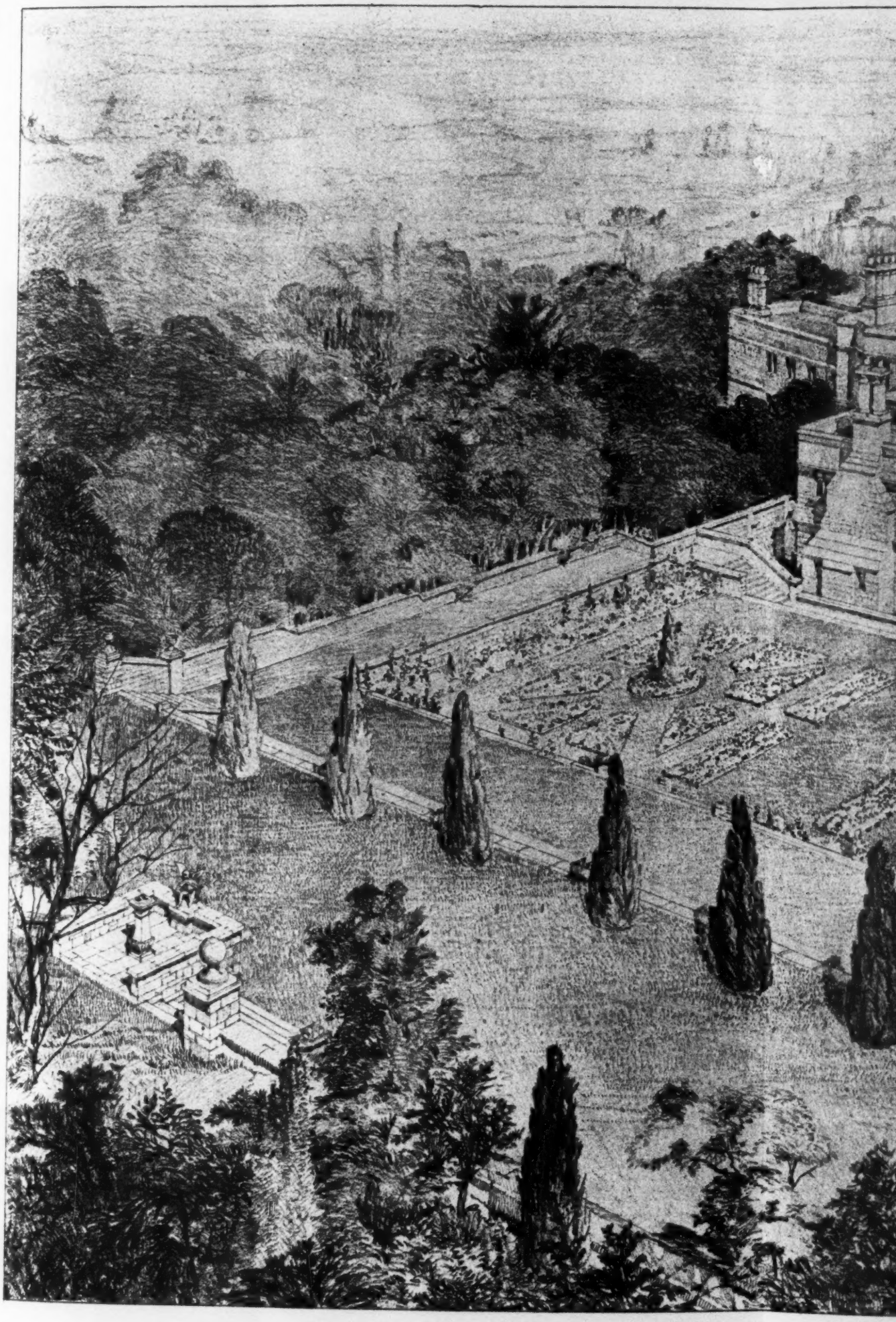

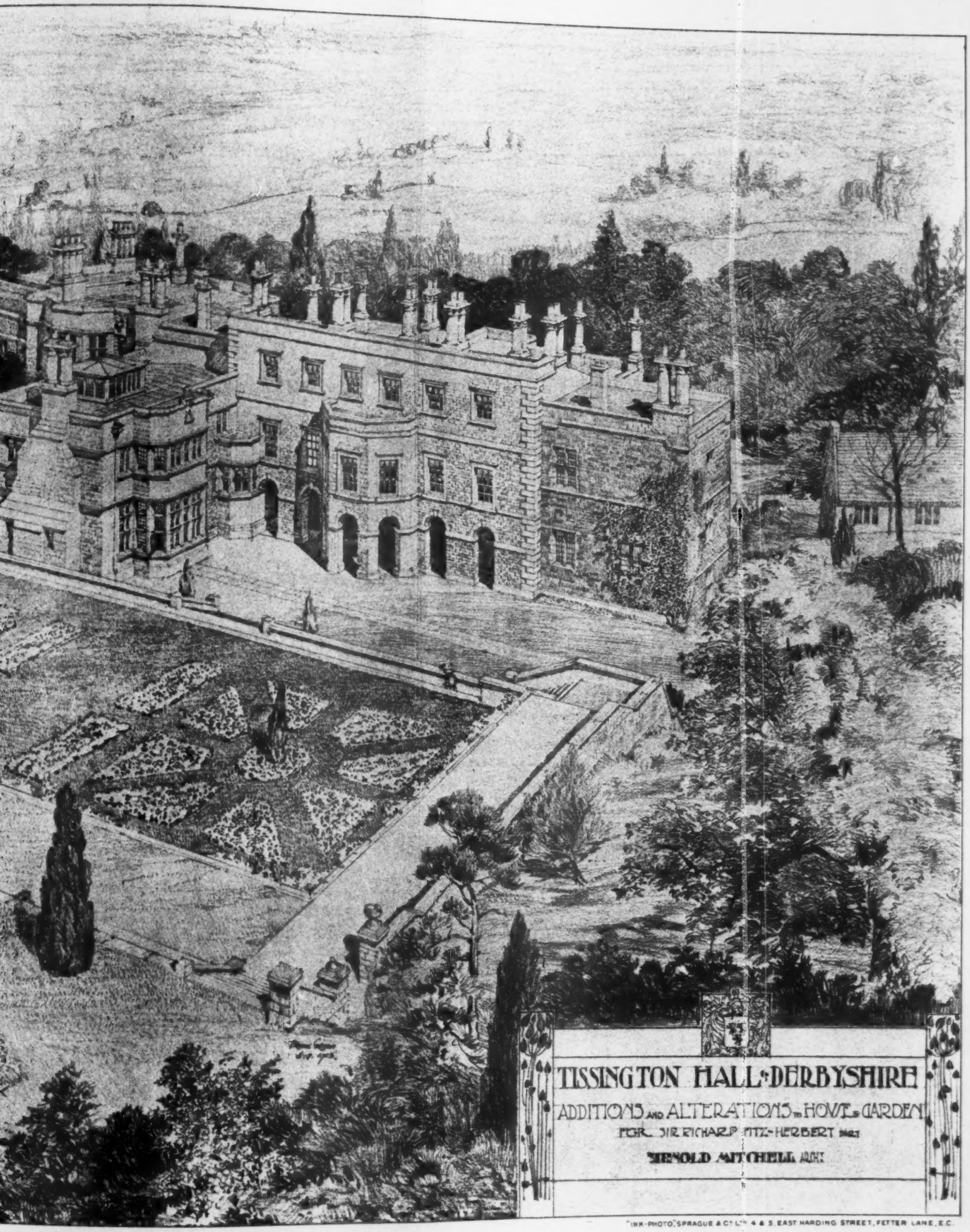

TISSINGTON HALL, DERBYSHIRE

ADDITIONS AND ALTERATIONS TO HOUSE & GARDEN

FOR SIR RICHARD FITZ-HERBERT BART

ARNOLD MITCHELL ARCHT

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NEW TOWN HALL & FIRE STATION, SUTTON COLDFIELD.

View from King Edward Square.

Ashpitel Maples & Hill
R. S. Tolkien
Architects.

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NEW TOWN HALL & FIRE STATION, SUTTON COLDFIELD.

View from Grounds

Arthur R. Wood & R. S. Edwards Architects

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TWO HOUSES, FOSSE ROAD, LEICESTER.

OFFICES, ST. MARTIN'S EAST, LEICESTER.

MESSRS. EVERARD & PICK, ARCHITECTS.

INK PHOTO SPRAGUE & CO LTD 4 & 5 EAST HARDING STREET, FETTER LANE, E.C.

MAYNARD ARMS INN, BAGWORTH, NEAR LEICESTER.

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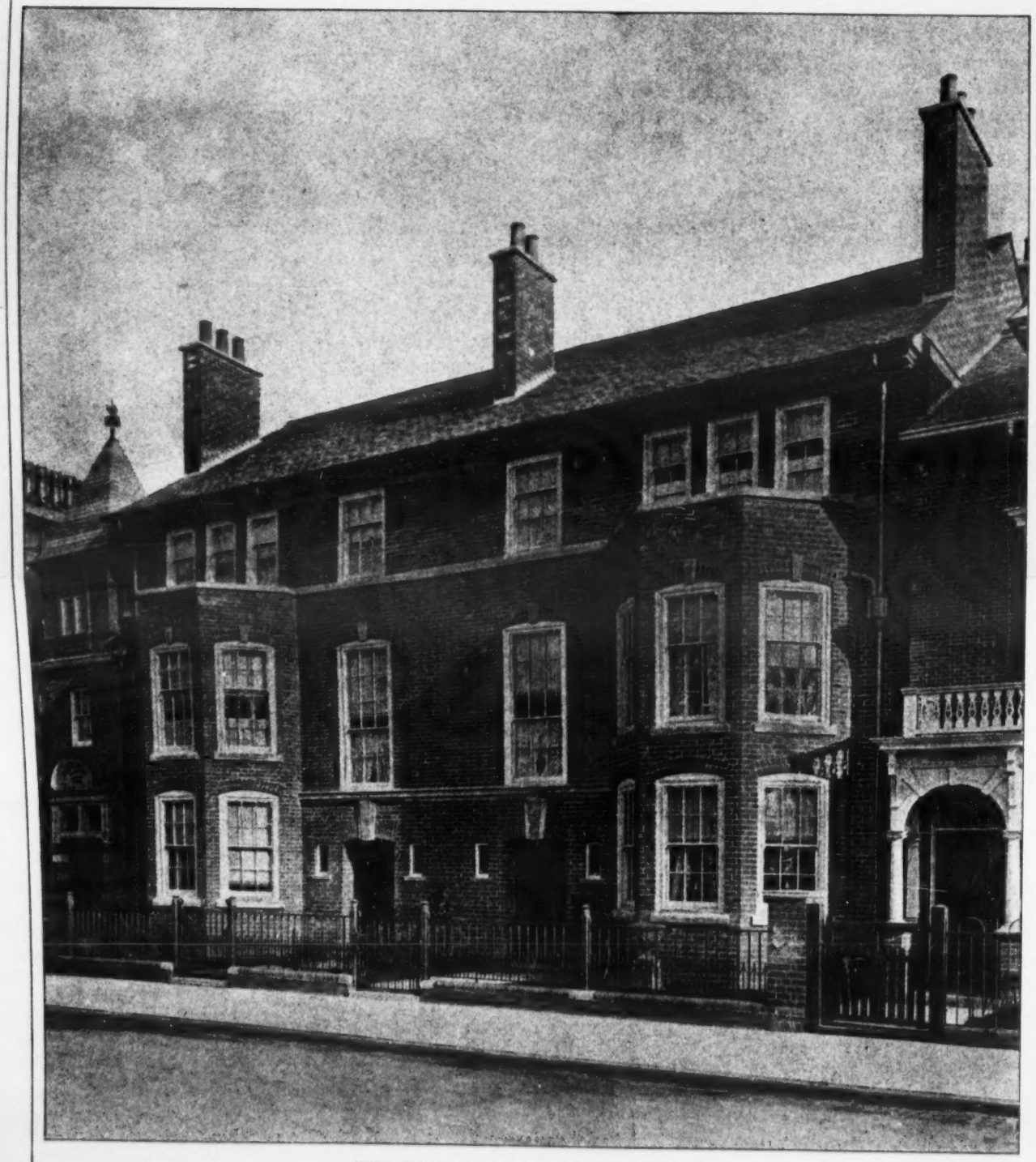
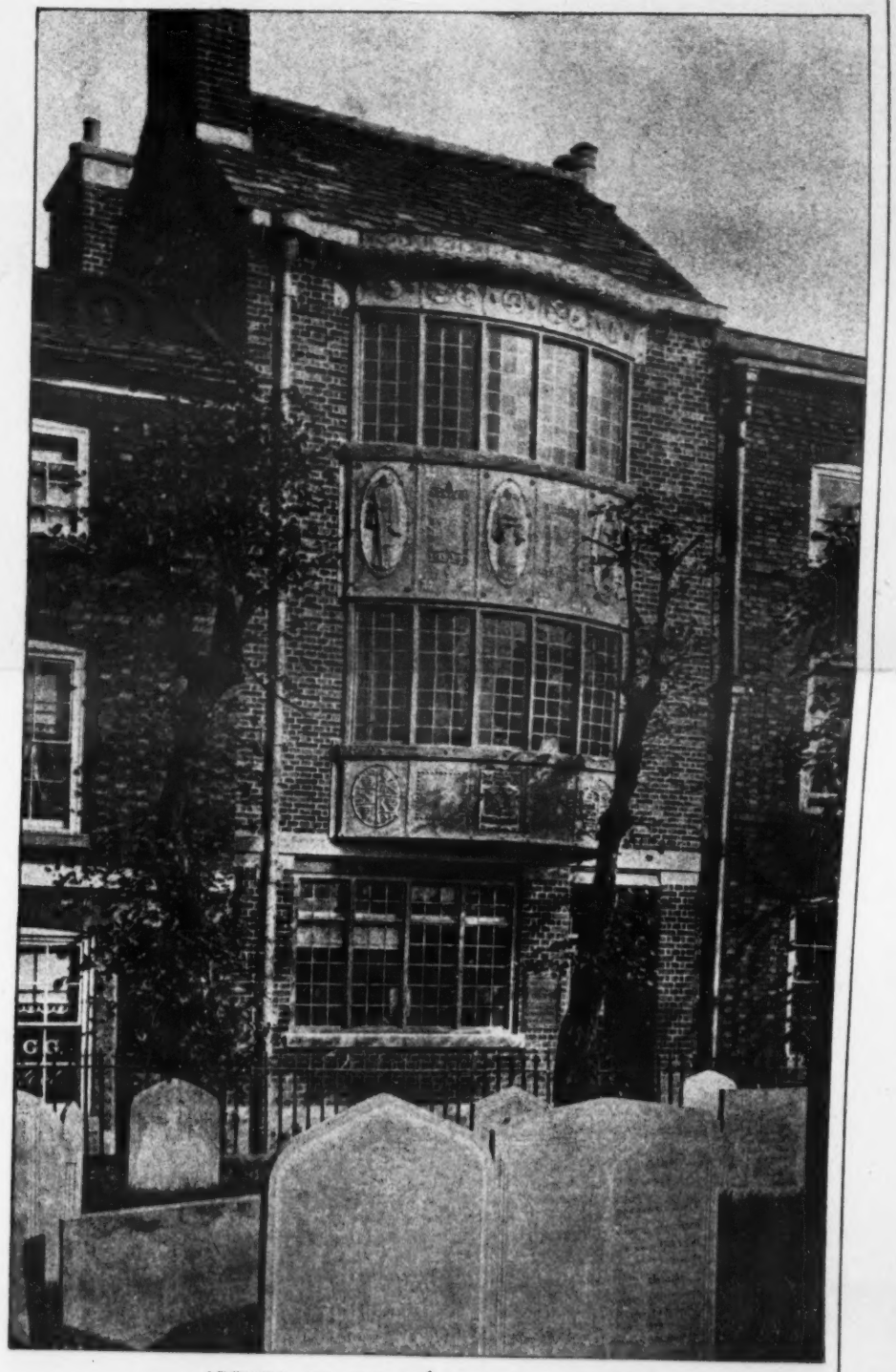


TWO HOUSES, FOSSE ROAD, LEICESTER.



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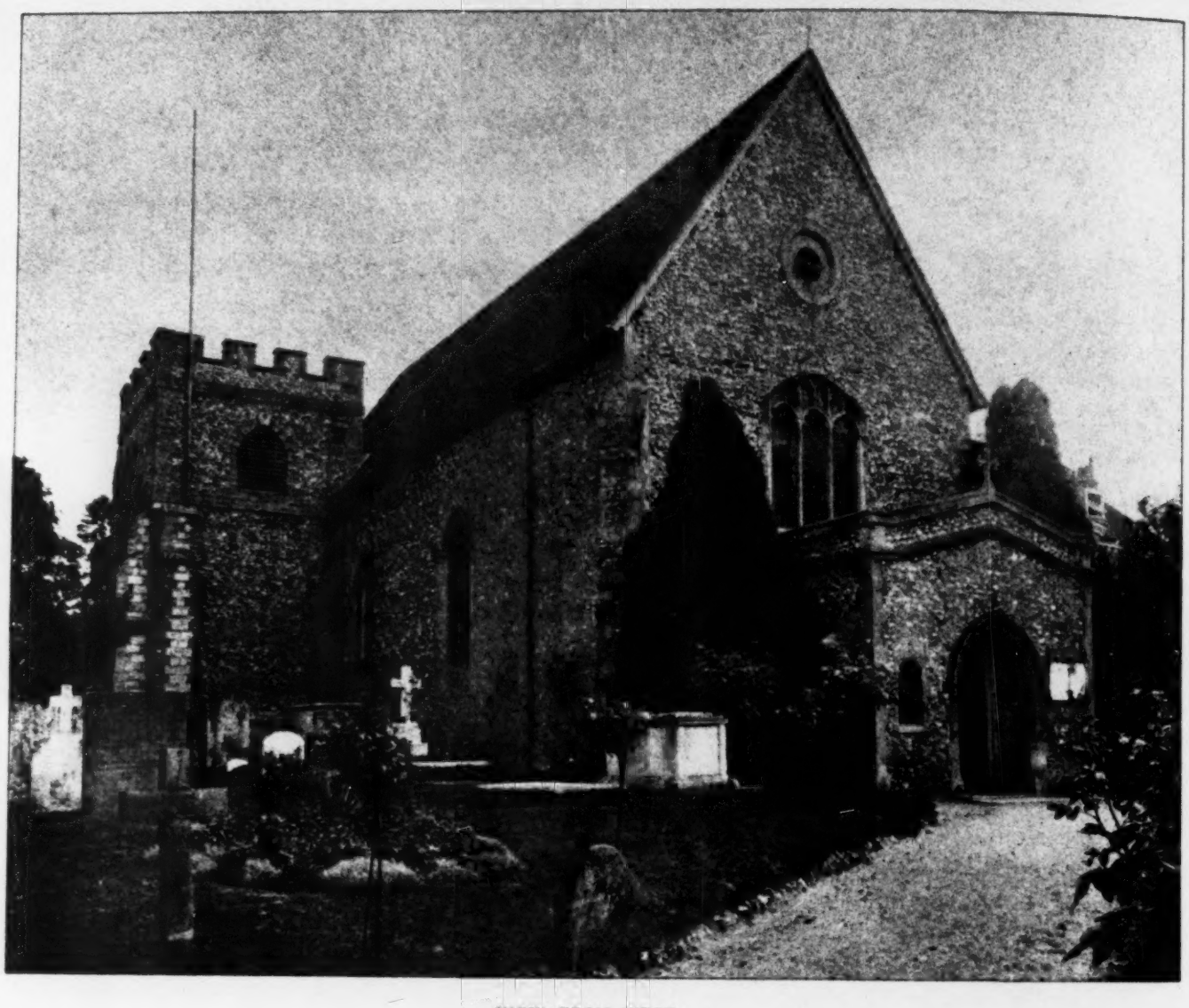
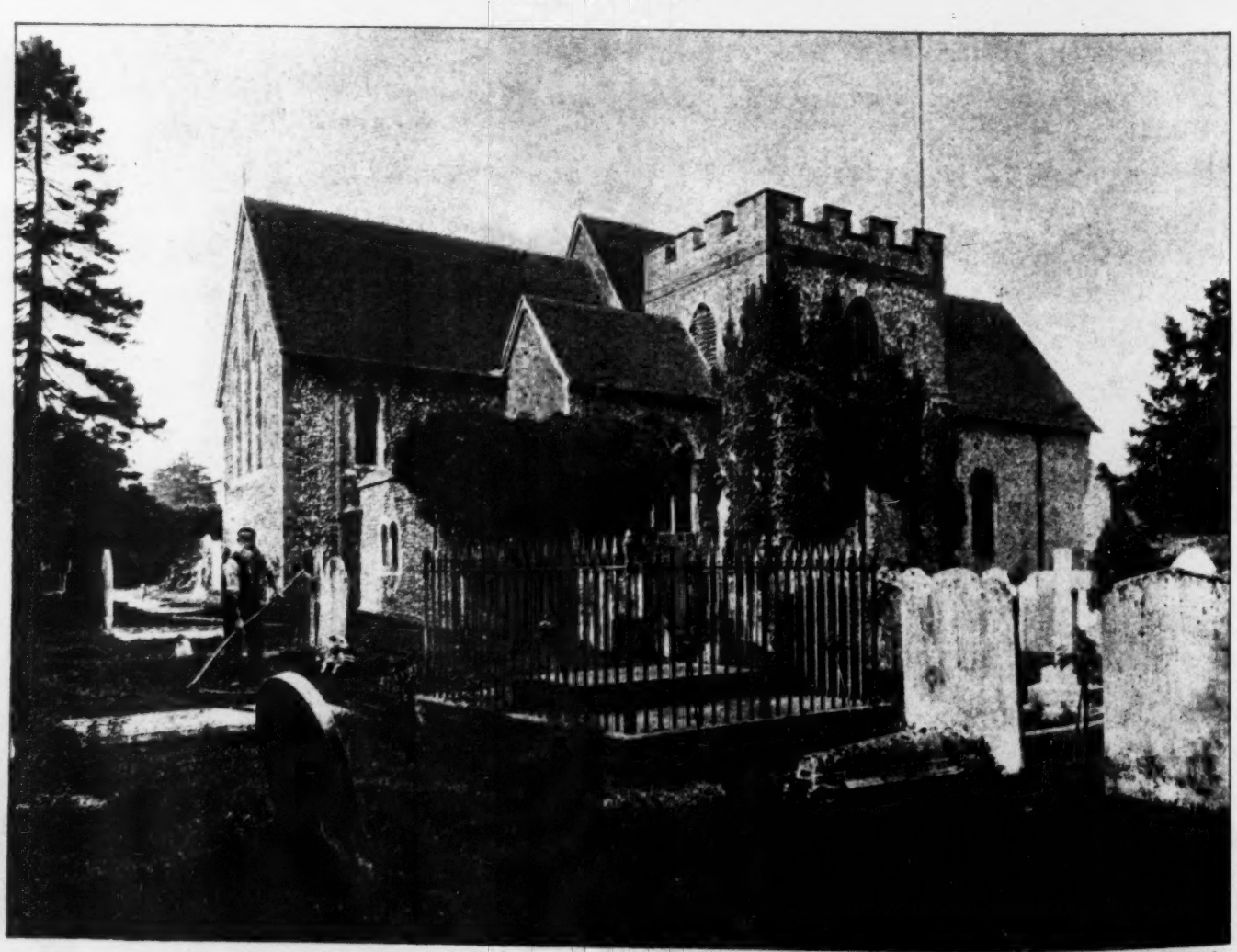


VIEW FROM WEST.



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VIEW FROM NORTH.

ORPINGTON CHURCH.

OKFINGTON CHURCH INTERIOR

THE BUILDER, APRIL 16, 1904

RIBA PHOTO SERVICE A.C.L.TD. 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

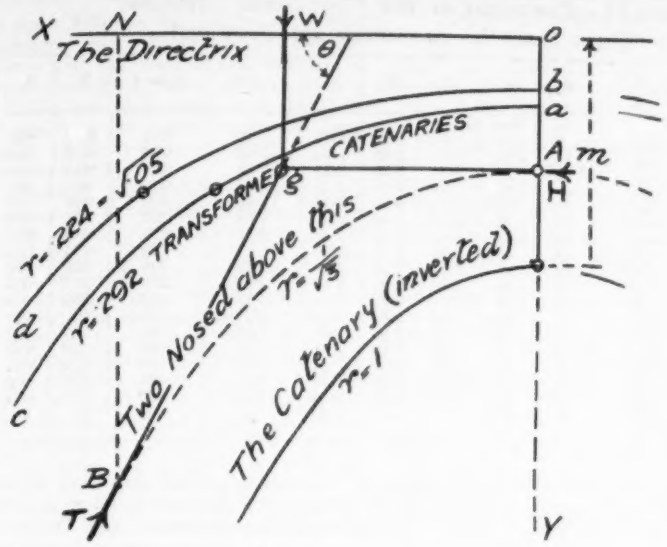

Fig. 63.

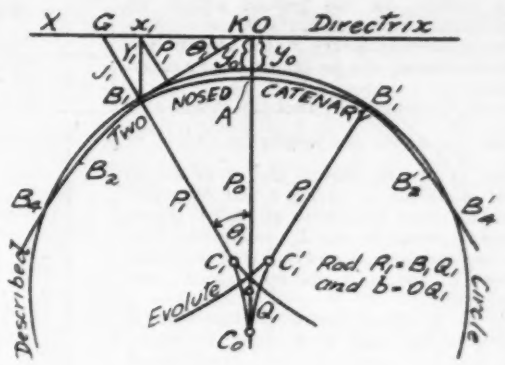

Fig. 64.

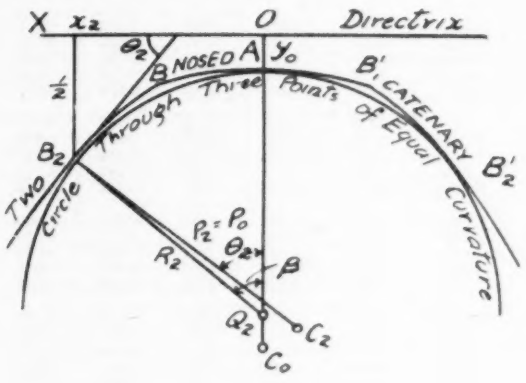

Fig. 65.

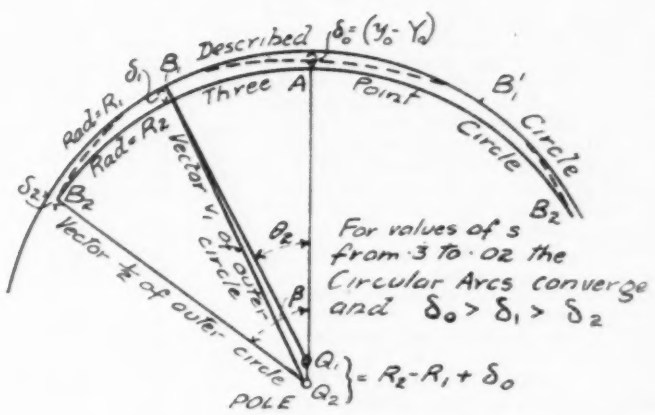

Fig. 66.

COMPETITIONS.

FREE LIBRARY, WAKEFIELD.—Eighty-one designs were received for the Free Library buildings, and, after obtaining advice from Mr. Maurice B Adams, F.R.I.B.A., of London, the City Council have adopted the Report of the Library Committee recommending that the premiums offered to competitors be awarded as follow:—Design No. 60 first premium, 80*l.*; design No. 17, second, 60*l.*; and design No. 66, third, 40*l.*

DISTRICT LIBRARY, HUTCHESONTOWN.—It is announced that the successful design for the Hutchesontown District Library was the one submitted by Mr. J. R. Rhind, architect, Inverness.

BOOKS RECEIVED.

HOW TO ESTIMATE: Being the Analysis of Builders' Prices. By J. T. Rea. Second edition. (B. T. Batsford. 7s. 6d.)

ADVENTURES AMONG PICTURES. By C. Lewis Hind. (London: Adam and Charles Black.)

DRAINAGE, SEWERAGE, AND CONSERVANCY IN TROPICAL COUNTRIES AND ELSEWHERE (the Belilios Prize article). By Major F. Smith, D.S.O. (London: J. Bale, Sons, and Danielsson, Ltd.)

REREDOS, ETC., CHADDESDEN, DERBY.—In St. Mary's Church, Chaddesden, a new reredos, an altar, oaken panelling, and communicants' kneelers were recently dedicated by the Lord Bishop of Southwell, in memory of the late Sir Henry Wilmot, Bart., V.C., K.C.B. The reredos has been erected from the designs of Mr. W. J. Tapper, architect, London.

A BURNE JONES EXHIBITION.—An Exhibition of drawings and studies by the late Sir Edward Burne-Jones, Bart., will shortly be held at the Leicester Galleries, Leicester-square. It has been organised with the assistance of Sir Philip Burne-Jones, and will include over one hundred drawings, the majority of which will now be seen for the first time. In another room of the same galleries there will be an exhibition of a collection of old stipple engravings. The opening of both exhibitions is fixed for April 18.

The Student's Column.

ARCHES.—XV.

IT may be remarked that the modified line of stress in the segmental arch ring C C_1, Fig. 62, bears only a vertical load, the bulk of which is due to the area included between the soffit and the formation level. The remainder of the load is distributed in a similar manner because of the thickening of the arch ring from the crown to the springing. Rankine demonstrates (see Article XII., p. 316) that a catenarian curve is the correct form for an arch rib supporting a masonry spandrel wall of which the whole weight comes upon the rib. As catenarian curves form the base of Alexander and Thomson's method for the design of arches, it is important that their treatment should be clearly understood.

Fig. 63 shows a series of catenaries, among which A B is an arc of the curve balanced under the vertical load area N O A B, so that H and T meet at the point g on the line of action of W, drawn vertically through the centre of gravity of the load area.

From Rankine's "Civil Engineering," Article 128, the equation for the common catenary is:—

$$y = \frac{m}{2}\left(e^{\frac{x}{m}} + e^{-\frac{x}{m}}\right)$$

where y = the ordinate of any point in the catenary (as B N, Fig. 63);
m = the modulus, or parameter (as A O, Fig. 63);
x = the abscissa of any point having the ordinate y; and
e = the base of the Naperian system of logarithms.

The transformed catenary is obtained by parallel projection—that is, by increasing or decreasing all the ordinates of a common catenary by a given ratio, termed the *ratio of transformation*, and which we will denote by the symbol r.

The equation for the transformed catenary is:—

$$y = r\,\frac{m}{2}\left(e^{\frac{x}{m}} + e^{-\frac{x}{m}}\right)$$

If $r = 1$, the curve is the common catenary, as given by the former equation, and indicated in an inverted position by a thick line in Fig. 63. The transformed catenaries A B, *ac*, and *bd* correspond with the values $r = \frac{1}{\sqrt{3}}$ $r = 0{\cdot}292$ and $r = 0{\cdot}224 = \sqrt{.05}$, respectively. An infinite variety of curves could be obtained by further variations in the value of r, the ratio of transformation.

It should be noticed, however, that any curves drawn below A B are of little importance in their application to arches. On the other hand, all curves above A B are of value in arch design. In the latter group the curvature is flat at the vertex, becoming gradually sharper until a point is reached such as that indicated by a small circle on *ac* and *bd*, and the curvature again flattens towards the points *c* and *d*, respectively.

The important ratio denoted by the symbol s is that of the depth of the load at the crown to the radius of curvature there, and in the transformed catenary is exactly the square of the ratio of transformation.

The value $s = \frac{1}{2}$ dividing the transformed catenaries into two groups—(1) those sharpest at the crown, and (2) those flattest at the crown—corresponds exactly with the value of s in Fig. 61. In that figure the value $s > \frac{1}{2}$ makes the conjugate horizontal load area entirely positive. Therefore, in an arch like that in Fig. 62, but with the formation level above the crown of the assumed line of stress by one-third or more of its radius, the horizontal load area would be entirely positive. If, then, an upper part were left out, the crown thrust would be decreased so that the modified line of stress would sharpen at the crown instead of flattening.

Two-Nosed Catenaries.—This designation is applied to catenaries in which the ratio of transformation is less than the square root of one-third. Curves of this description are discussed in considerable detail in the paper read by Alexander and Thomson before the Royal Irish Academy, and their work on "Elementary Applied Mechanics" contains that part of the treatment of the curves which was necessary for the construction of their tables for the direct design of segmental

masonry arches. In the present article we omit mathematical demonstrations and expressions except those necessary for the explanation of the tables stating the properties of two-nosed catenaries.

It can be demonstrated that for values of r less than $\frac{1}{\sqrt{3}}$ there is a maximum radius of curvature ρ_0 at the crown, and a minimum radius of curvature ρ_1 giving a pair of points symmetrical about the crown or vertex. These points are the noses B_1 and B'_1 in Fig. 64. The abscissa, ordinate, slope, and radius of curvature of the nose B_1 are designated by x_1, y_0, θ_1, and ρ_1, respectively.

If ρ_1 be produced to meet the vertical through O at Q_1, and if a circle be drawn from Q_1 with a radius $Q_1 B_1 = R_1$, it will touch the curve externally at its two noses. This is called the *described circle*, and it is outside the finite arc B_2 A B'_2 here considered.

Fig. 65 shows a circle drawn from the centre Q_2, with a radius $Q_2 B_2 = R_2$, passing through the three points B_2 A B'_2 of common curvature. This is called the *three-point circle*. It touches the curve internally at A, and sensibly touches it at B'_2 and B_2 as the slope of the curve θ_2 and that of the circle at B_2 never differ by more than $2\frac{1}{2}$ degrees. For all practical purposes this circle is inscribed in the curve.

Fig. 66 shows the finite arc B_2 B_1 A B'_1 B'_2 between the arcs of the *described* and the *three-point* circles. The distance apart of these two circles is $\delta_0 = y_0 - Y_0$ at the crown, and δ_2 at each end. As will be seen by Table IV., these distances are very small as compared with the length of the radii, and when used for the boundary of a load area the arc of the three-point circle is practically the same as the finite arc of the two-nosed catenary.

In Table IV. the modulus, m, is taken at unity, r at given values not less than $\sqrt{\frac{1}{3}}$, and various values for the different quantities have been calculated.

In Table V. the quantities are based upon the radius of the described circle, the value of which is taken as unity, and the table is derived by dividing each linear quantity in Table IV. by the corresponding value of R_1. Since s, θ_1 and θ_2 are independent of R_1, all the two-nosed catenaries in Table IV. can be constructed within a described circle of radius $R_1 = 1$, merely by changing each ordinate proportional to R_1. If R_1 has any value other than unity, it is only necessary to multiply the quantities by the new value of the radius. Table V. has for its purpose, in conjunction with supplementary tables, the designing of arch rings so as to secure the condition of the line of stress lying within a *kernel* forming the middle third, fifth, or ninth of the arch ring as may be required to give strength and stability for variations of the proportions of the structure, and of the nature and distribution of the loading.

Table VI. is derived from Table V., the value of s being unaltered. The thickness of the keystone is made equal to $3\,\delta_0$, thus confining the line of stress to a kernel which is the middle third of the arch ring, and the upper limit of the kernel is the described circle of the line of stress. The depth of the crown of the soffit from the directrix, or formation level, is $d = y_0 + \delta_0$. In order that the arch ring may increase in depth as it leaves the crown the soffit is made the three-point circle of a two-nosed catenary which lies at the distance d below the directrix at the crown. This result is attained as follows:—

In any line of Table VI. take the value of d, and divide it by the value of m in that line produced into Table V. Look in Table IV., under the heading y_0, for the calculated quotient, take the corresponding value of R_2 and place it in Table VI., under the heading R, after multiplying by m. The rise and span of the soffit are $k = R$ vers θ_2, and $2c = 2R$ sin. θ_2.

In the third column of the fourth line from the bottom of Table VI., and identified with the value $s = 0{\cdot}05$, the thrust of the crown $wd \times \rho_0 = 140 \times 0{\cdot}089 \times 1{\cdot}3634 = 16{\cdot}987$, and dividing this by $t_0 = 0{\cdot}061$, the average thrust on the crown joint is found to be 278 lb. per sq. ft. Multiplying by 2, as the maximum is double the average thrust, the maximum thrust on the keystone is seen to be 556 lb. per sq. ft. The value of f for sandstone, allowing a factor of safety of 10, is taken at 57,600 lb. per sq. ft., and, dividing this by 556, we have the maximum multiplier 104, as given in Table VI. Any smaller multiplier naturally increases the factor of safety.

In the fourth column of the same table the

TABLE IV.—PROPERTIES OF THE "TWO-NOSED CATENARY."
(FROM TABLE A.—ALEXANDER AND THOMSON.)

m	$r = \sqrt{s}$	$s = \frac{y_0}{\rho_0}$	θ_1	θ_2	R_1	R_2	ρ_1	$\rho_0 = \rho_2$	$y_0 = r$	Y_0	δ_0	δ_2
			deg.	deg.								
1	$\sqrt{\frac{1}{3}}$	·333	0	0	1·73	1·73	1·73	1·73	·577	·577	·000	·000
1	$\frac{1}{4}$	·250	19	28	1·97	1·98	1·94	2·00	·500	·499	·000	·000
1	—	·180	25	39	2·24	2·25	2·13	2·35	·424	·419	·004	·002
1	—	·170	26	41	2·29	2·30	2·15	2·42	·412	·406	·005	·003
1	—	·160	27	42	2·34	2·35	2·18	2·50	·400	·392	·007	·004
1	—	·150	27	44	2·39	2·40	2·20	2·58	·387	·378	·009	·005
1	—	·140	28	45	2·44	2·45	2·23	2·67	·374	·363	·011	·006
1	—	·130	28	46	2·50	2·51	2·26	2·77	·360	·347	·013	·008
1	—	·120	29	48	2·57	2·58	2·28	2·88	·346	·330	·016	·010
1	$\frac{1}{9}$	·111	30	49	2·63	2·63	2·30	3·00	·333	·313	·019	·012
1	—	·100	30	51	2·72	2·72	2·33	3·16	·316	·292	·024	·016
1	—	·090	31	52	2·80	2·80	2·36	3·33	·300	·270	·029	·019
1	—	·080	31	54	2·89	2·88	2·39	3·53	·282	·247	·035	·025
1	—	·070	32	55	3·00	2·99	2·41	3·77	·264	·220	·043	·032
1	$\frac{1}{16}$	·063	32	57	3·09	3·07	2·43	4·00	·250	·199	·051	·039
1	—	·050	33	59	3·28	3·24	2·46	4·47	·223	·156	·066	·054
1	$\frac{1}{25}$	·040	33	61	3·46	3·40	2·49	5·00	·200	·115	·084	·073
1	—	·000	35	90	∞	∞	2·60	∞	·000	—	—	—

TABLE V.—A SERIES OF "TWO-NOSED CATENARIES" INSCRIBED IN THE CIRCLE OF RADIUS (R) UNITY, AND HAVING PARALLEL DIRECTRICES AT GRADUATED DISTANCES (R + Y) FROM ITS CENTRE FROM (1 + ·187) TO (1 + ·023). (FROM TABLE B.—ALEXANDER AND THOMSON.)

s	θ_1	θ_2	m	R_1	R_2	ρ_1	$\rho_0 = \rho_2$	y_0	Y_0	δ_0	δ_2
·180	25°37	39°46	·4455	–	1·0024	·9491	1·0501	·1890	·1869	·0021	·0010
·175	25°58	40°28	·4410	–	1·0024	·9452	1·0543	·1845	·1821	·0023	·0011
·170	26°20	41°11	·4365	–	1·0024	·9413	1·0586	·1800	·1774	·0026	·0013
·165	26°40	41°53	·4319	–	1·0024	·9370	1·0635	·1754	·1726	·0028	·0015
·160	27°01	42°36	·4273	–	1·0024	·9327	1·0684	·1709	·1678	·0031	·0017
·155	27°20	43°18	·4226	–	1·0023	·9279	1·0738	·1664	·1629	·0034	·0019
·150	27°40	44°00	·4180	–	1·0022	·9232	1·0793	·1619	·1581	·0038	·0021
·145	27°59	44°42	·4132	–	1·0021	·9180	1·0856	·1574	·1532	·0042	·0023
·140	28°18	45°24	·4085	–	1·0020	·9129	1·0919	·1529	·1484	·0045	·0026
·135	28°36	46°06	·4036	–	1·0019	·9071	1·0990	·1483	·1434	·0049	·0029
·130	28°55	46°49	·3988	–	1·0017	·9014	1·1061	·1438	·1384	·0054	·0032
·125	29°12	47°31	·3938	–	1·0014	·8952	1·1142	·1392	·1333	·0059	·0035
·120	29°30	48°14	·3888	–	1·0011	·8890	1·1224	·1347	·1283	·0064	·0039
·115	29°47	48°57	·3836	–	1·0007	·8821	1·1318	·1301	·1231	·0070	·0043
·110	30°04	49°41	·3785	–	1·0004	·8752	1·1412	·1255	·1180	·0076	·0048
·105	30°20	50°25	·3731	–	0·9998	·8676	1·1521	·1209	·1127	·0082	·0053
·100	30°37	51°09	·3678	–	0·9993	·8600	1·1631	·1163	·1074	·0089	·0058
·095	30°52	51°54	·3622	–	0·9987	·8517	1·1760	·1116	·1019	·0097	·0064
·090	31°08	52°40	·3567	–	0·9981	·8433	1·1889	·1070	·0965	·0105	·0071
·085	31°23	53°27	·3508	–	0·9972	·8340	1·2043	·1023	·0908	·0114	·0079
·080	31°39	54°14	·3450	1	0·9963	·8246	1·2197	·0976	·0852	·0124	·0087
·075	31°54	55°03	·3388	1	0·9951	·8141	1·2384	·0928	·0793	·0134	·0097
·070	32°09	55°53	·3326	1	0·9940	·8036	1·2571	·0880	·0735	·0145	·0108
·065	32°23	56°45	·3259	1	0·9925	·7917	1·2803	·0831	·0673	·0158	·0121
·060	32°38	57°38	·3193	1	0·9910	·7798	1·3036	·0782	·0611	·0172	·0134
·055	32°52	58°34	·3121	1	0·9890	·7661	1·3335	·0732	·0544	·0188	·0150
·050	33°06	59°31	·3049	1	0·9870	·7524	1·3634	·0682	·0478	·0204	·0167
·045	33°20	60°34	·2968	1	0·9842	·7363	1·4037	·0630	·0406	·0223	·0190
·040	33°33	61°37	·2888	1	0·9815	·7203	1·4440	·0578	·0334	·0243	·0213
·035	33°46	62°49	·2808	1	0·9788	·7040	1·4843	·0526	·0260	·0263	·0236

Independent of R_1. | Directly proportioned to R_1, and subject to any multiplier.

TABLE VI.—SUPPLEMENTARY TO TABLE V.
(FROM TABLE B_1—ALEXANDER AND THOMSON.)

Strong Brick. $w = 112$ $f = 154{,}000$.		Sandstone. $w = 140$ $f = 576{,}000$.		Granite. $w = 164$ $f = 1{,}350{,}000$.		Surcharge over top of keystone.	Depth of load from directrix to crown of soffit.	Thickness of arch ring normal to soffit at crown.	Thickness of arch ring normal to soffit at θ_2 joint of rupture.	Radius of the soffit.	Rise of segment of soffit subtending $2\,\theta_2$.	Span of segment of soffit subtending $2\,\theta_2$.	Sq. of ratio of transformation $= y_0 \div \rho_0$.
Max. Multiplier.	Max. span.	Max. Multiplier to give factor of safety 10.	Max. value of span $2c$ with that Multiplier.	Max. Multiplier.	Max. span.								
					Feet.								
				50	72	·122	·141	·019	·026	·973	·325	1·451	·120
				55	81	·116	·137	·021	·029	·970	·333	1·462	·115
			Feet.	61	90	·110	·133	·023	·033	·966	·341	1·473	·110
				68	104	·104	·129	·025	·037	·962	·349	1·482	·105
		38	56	76	112	·098	·125	·027	·041	·957	·357	1·491	·100
		42	63	84	126	·092	·121	·029	·045	·952	·364	1·497	·095
		46	70	92	140	·085	·117	·032	·049	·946	·372	1·504	·090
		51	78	102	156	·079	·113	·034	·055	·940	·380	1·509	·085
	Feet.												
19	29	57	86	114	172	·073	·110	·037	·062	·933	·388	1·514	·080
21	32	63	95	126	190	·066	·106	·040	·071	·925	·395	1·516	·075
23	35	69	105	138	210	·059	·103	·044	·081	·917	·403	1·518	·070
25	39	77	116	154	232	·051	·099	·048	·089	·907	·409	1·516	·065
28	43	85	128	170	256	·043	·095	·052	·097	·896	·416	1·514	·060
31	47	94	141	—	—	·036	·092	·056	·110	·883	·421	1·506	·055
35	52	104	155	—	—	·028	·089	·061	·123	·869	·427	1·498	·050
38	57	—	—	—	—	·018	·085	·067	·141	·850	·431	1·480	·045
42	62	—	—	—	—	·009	·082	·073	·159	·831	·436	1·462	·040
46	67	—	—	—	—	·000	·078	·078	·177	·812	·441	1·444	·035
One-third.	—	$205 \div \frac{\rho_0 d}{t_0}$	—	Double.	—	Subject to a mult. less than given max., to give factor of safety greater than 10 in inverse ratio.							

w is in lb. per cubic ft. f is in lb. per sq. ft.

maximum span between the points of rupture for a sandstone arch whose proportions are in accordance with the other dimensions stated on the same line is $2c \times 104 = 1{\cdot}498 \times 104 = 155$ ft. Multipliers and spans are given in columns 1 and 2 for brick, and in columns 5 and 6 for granite. In the seventh column $(d - t_0) = 0{\cdot}028$ is the surcharge.

The thickness of the voussoir at the joint of rupture sloping at θ_2 is thus obtained. The radius of the described circle as given in the fourth lowest line of Table V. is $R_1 = 1$. The radius of the soffit is $Q A = R = 0{\cdot}869$. If a circle were described from the centre Q concentric with the soffit and touching the described circle at the crown, its radius would be $R + 2\delta_0 = 0{\cdot}869 + 2 \times 0{\cdot}0204 = 0{\cdot}9098$. The two circles would be, as shown in Fig. 62, p. 393, the described circle of radius = 1, and the circle concentric with the soffit of radius = 0·9098. By the approximation in Article XIV., p. 394, the distance apart of these two eccentric circles at the springing is the difference of their radii multiplied by $(1 - \cos. \theta_2)$. Taking $\theta_2 = 59$ deg. 31 min. = 0·5073, and denoting the distance by Z, we have :—

$$Z = (1 - 0{\cdot}9098)(1 - 0{\cdot}5073) = 0{\cdot}044.$$

Adding the distance between the soffit and the circle drawn concentric to it, namely $2\delta_0 = 2 \times 0{\cdot}0204 = 0408$, we have, for the distance between the soffit and the described circle at the springing joint,

$$0{\cdot}044 + 0{\cdot}0408 = 0{\cdot}0848.$$

Increasing this by 50 per cent., to provide for the outer third of the arch ring, we get $t_3 = 0{\cdot}1272$, or, making a closer approximation, $t_3 = 0{\cdot}123$, as in Table VI.

The thickening of the arch ring from the crown outwards by this tabular method insures that the line of stress, commencing at the lower trisecting point or the crown joint, just reaches the upper trisecting point of the higher joint of rupture, Fig. 62, and returns towards the centre of the middle third of the arch ring.

In "Civil Engineering," p. 421, Rankine assumes that the condition of stability will be satisfied by insuring the centre of stress to be in the middle third of the crown joint, and of his 45 degrees joint of rupture. This is not sufficient, and Rankine was evidently unaware of the point of maximum curvature on the line of stress near the angle of 30 degrees.

Supplementary tables similar to Table VI. can be derived for other conditions as found to be necessary.

OBITUARY.

MR. FRANCIS NEWMAN, J.P.—The death has just taken place, at St. Paul's, Ryde, of Mr. Francis Newman, J.P., C.E., the County Surveyor for the Isle of Wight. Mr. Newman, who was seventy-three years of age, was a native of the Island, and was elected Surveyor to the Ryde Commissioners on January 13, 1857, and held office after the borough was incorporated until 1872. Then, owing to a municipal change of *régime*, he was out of office for a time, but was re-elected again in 1875, and continued to serve the town until 1897. He did much arbitration work, amongst other things in connexion with the construction of the Joint Railway works at Ryde. On the constitution of the Island as an administrative county he was appointed County Surveyor, which office he held at the time of his death. A few years ago his name was added to the Commission of the Peace for the borough. Mr. Newman was one of the founders of the Ryde School of Science and Art. When the Ryde Science and Art Council was constituted for its management he was elected chairman of that body.

MR. TUCKER.—The death is announced of Mr. Ernest Penkivil Tucker, of Trinity-road, Tulse-hill, in his forty-second year. Mr. Tucker was elected a member of the Architectural Association in 1881, and, having served his articles to his uncle, Mr. Samuel Tucker, of London, practised in co-partnership with Mr. Arthur Huntley, under the style of Messrs. Tucker and Huntley.

MR. J. MOSSOP.—News of the death of Mr. John Mossop, formerly in practice as an architect in Kidderminster, has been cabled from China. Mr. Mossop purchased the practice of the late Mr. T. D. Baker at Kidderminster, and was a well-known man in that borough. He became associated with the Volunteer force, and was Captain of the 3rd Kidderminster Company. He took great interest in various local matters. Mr. Mossop left Kidderminster about ten or twelve years ago to take up a public appointment in Hong Kong. Subsequently he moved to Shanghai. The deceased gentleman was forty-five years of age.—*Birmingham Daily Post.*

GENERAL BUILDING NEWS.

CHURCH, RAYNES PARK.—It is proposed to erect St. Saviour's permanent Church at Raynes Park, near Wimbledon. It will be built from the designs of Mr. Arthur C. Blomfield.

CHURCH, RADYR.—The dedication has just taken place of the nave of a new church to be known as Christ's Church. The new church, when completed, will consist of a nave, south porch, chancel, and vestries, and a tower and spire, of which the nave and south porch have been erected, the architect being Mr. G. E. Halliday. The window tracery and external dressings are of stone, while the open timber roof is covered with Pembrokeshire green slates. The work has been carried out by Mr. A. W. Cadwallader, Cardiff. The church at present will accommodate about 250 worshippers, and has been planned for a further extension to seat an additional 150. The cost of the portion erected will be about 2,000*l.*, and when the building is completed the cost is estimated at about 5,000*l.*

EAST END, ST. JOHN'S CHURCH, NORWICH.—Considerable progress has been made during the last twelve months with the east end of the Catholic Church of St. John Baptist, now being erected on the site of the old Norwich City Prison, at the expense of his Grace the Duke of Norfolk. The nave was opened for service on August 29, 1894, and the work now in hand comprises the chancel, transepts, and eastern chapels. Sir Gilbert Scott was the original architect, and the work has been carried on since by Mr. John Oldrid Scott.

CHURCH, HIGHWEEK, DEVONSHIRE.—Mr. Sedding, of Plymouth and London, has been selected as architect for the new church in the place of St. Mary's Chapel of Ease at Highweek. The preliminary plans have been approved. The total cost is estimated at 13,000*l.*, but it is only intended to carry out a part of the scheme first, leaving the tower to be erected at a future date.

NEW CHURCH, SEATON DELAVAL.—A new church is to be erected at a cost of over 1,600*l.* at Seaton Delaval. The new building will be of red brick and has been designed by Mr. Errington, architect, of Newcastle.

CHURCH EXTENSION, WEST DERBY.—The Bishop of Liverpool recently consecrated the new Church of the Good Shepherd in Carr-lane, West Derby. The new edifice is to form a chapel of ease to the West Derby parish church. The architect for the work is Mr. Oldrid Scott.

WESLEYAN CHURCH, OLDBURY.—A new Wesleyan church was opened on the 24th ult. in Barker-street, Tat Bank, Oldbury. The new building will accommodate 300 persons, and has cost between 1,700*l.* and 1,800*l.* Mr. E. Wood was the architect.

METHODIST CHURCH, LINCOLN.—The new Free Methodist Church in Portland-street, Lincoln, was opened on the 6th inst. The total cost of the new chapel is about 2,000*l.* The architect was Mr. J. H. Cooper, and the contractors were Messrs. W. and M. Halks, of Portland-street.

WESLEYAN CHURCH, PLYMOUTH. — The memorial stones of the "introductory" church and school-rooms at Mount Gold-road, Plymouth, were laid on the 4th inst. In addition to the "introductory" church, there will be a minister's vestry, school, and five class-rooms. The buildings already contracted for will cost about 4,600*l.*, and will occupy a third of a total area of 19,950 sq. ft. The total cost of the present scheme is about 6,000*l.* The contractor is Mr. A. N. Coles, and the architect Mr. H. J. Snell.

WESLEYAN CHAPEL, HAMPSTHWAITE, YORKSHIRE.—A new Wesleyan chapel has just been opened at Hampsthwaite. The buildings are in the Perpendicular style, and are built of local stone, and the roof is covered with blue slates. The accommodation comprises a chapel to seat 106 persons, exclusive of the choir; to the left of the building is placed a small schoolroom, which, when necessity demands, can be used as an adjunct of the chapel. A class-room and entrance-porch are on the same side of the main building, and on the opposite side is a minister's vestry and a small stable. The cost of the buildings complete will be about 800*l.* The architects are Messrs Bland and Bown, Harrogate, the various work having been carried out by the following contractors:—Mason and bricklayers' work by Messrs. Barker Bros., Hampsthwaite; joiners' work and fittings by Mr. R. Settle, Summerbridge; slating by Messrs. J. and W. Baynes, Harrogate; plastering by Mr. C. Shaw, Harrogate; plumbing by Mr. G. Thompson, Leeds; leaded lights by Messrs. Kayll and Co., Leeds; wrought-iron railings and gates by Messrs. O. Atkinson and Son, Harrogate; tiling by Mr. Edwards, Leeds; acetylene gas installation by Messrs. S. Hudson and Son, Yeadon.

WESLEYAN EXTENSION, BRIGHOUSE.—The members of the Wesleyan community at Brighouse are about to erect a new mission hall, for which a site has been secured with a frontage to Birds Royd-road. Competitive plans were invited for the erection of a new hall, and the design submtted by Mr. A. G. Dalzell, architect, Halifax, was accepted. In addition to the hall there will be six class-rooms, four of which, by means of movable partitions, can be thrown into the hall. The cost will be from 800*l.* to 1,000*l.*

METHODIST CHAPEL, GRINDLEFORD.—The foundation-stones of a new Methodist chapel were laid at Grindleford Bridge on Easter Monday. The architect is Mr. J. W. Rowley, of the firm of Messrs. Billing, Son, and Rowley, and the builders are Messrs. Hill Bros., of Litton and Tideswell.

WESLEYAN CHAPEL, FINEDON.—The new Wesleyan Chapel at Finedon was opened recently. The new chapel, which will accommodate 600 people—440 of whom can seat themselves on the ground floor, 120 in the gallery, and forty in the choir stalls—has been erected by Mr. R. Marriott, of Rushden, under the superintendence of the architect, Mr. T. Dyer, of the firm of Messrs. H. H. Dyer, Son, and Winterburn, Northampton.

SUNDAY SCHOOLS, LOUGHBOROUGH.—Memorial stones and bricks were laid on the 4th inst. in connexion with the new United Methodist Free Church Sunday Schools, Sparrow Hill, Loughborough. The plans were prepared by Mr. W. H. Dinsley, of Chorley, Lancashire, and the contract for 500*l.* was given to Messrs. W. Corah and Son.

SCHOOLS, WEST BROMWICH.—The new Council Elementary Schools, which have been erected on the Lodge estate at West Bromwich, were opened on the 30th ult. by the Mayor. The schools provide accommodation for 1,060 boys, girls, and infants. The contract for the erection of the buildings was 12,225*l.* Mr. A. Long was the architect.

CARSTAIRS JUNCTION SCHOOL.—The opening of Carstairs Junction new public school took place recently. The architect was Mr. Trail, of Messrs. Trail and Steuart, architects, Lanark. The total cost of the school has been about 3,700*l.*

ADULT SCHOOL, SCARBOROUGH.—In Roscoe-street, Scarborough, off Falsgrave-road, a building has been erected from the plans of Mr. Fred Rowntree, architect, comprising a hall for public meetings, four rooms for smaller gatherings, a library, a billiard-room, and a kitchen. The primary purpose is to provide accommodation for some of the adult classes and for the social and intellectual recreation connected therewith, and incidentally to offer to lodges, trade societies, athletic clubs, and the like, a meeting-place free from the sale of intoxicants.

BUSINESS PREMISES, ST. PAUL'S CHURCHYARD.—New business premises have been erected at the corner of St. Paul's Churchyard and Dean's-court, from the designs of Messrs. H. H. and M. E. Collins, of Old Broad-street. The ground floor is of Labrador granite, while the five upper floors are of Portland and Beer stone. A feature of the elevation is the angle dome, with its copper cupola. The building has been carried out—under the supervision of Mr. A. T. Waterfield, acting as the clerk of works for the architects—by Messrs. Kirk and Kirk, of Westminster.

NEW PAVILION AND PIER EXTENSION, ST. ANNE'S-ON-THE-SEA.—The extensions and the addition of a new pavilion to the pier at St. Anne's-on-the-Sea have just been completed. The promenade, which was about 19 ft., has been widened to 34 ft., and a promenade 10 ft. wide has been made round the back of the old shops, and shelters provided half way up the promenade. The pier head, which was 66 ft. wide for a portion, and 95 ft. wide at the end, has been widened to 221 ft. all through. On the north side of the pier head a pavilion, with an auditorium, 84 ft. by 56 ft., with sitting accommodation for nearly a thousand people, has been erected. Messrs. Garlick and Sykes, architects, of Blackpool, prepared the plans for the work, the total cost of which was 30,000*l.*

CORONATION COTTAGE HOSPITAL, ILKLEY.—The Bishop of Ripon laid the foundation-stone on the 7th inst. of a cottage hospital at Ilkley, which is to be known as the Ilkley Cottage Hospital. For a beginning the hospital will provide accommodation for only six patients. The site of the new hospital is part of the Grammar School playing field, a few minutes' walk from the station along Springs-lane, which is now being widened and reconstructed. The building will be built of stone, and provision will be made for extension as funds are provided and circumstances require. The accommodation for patients will be on the ground floor, which will also contain an operating-room and a dispensary. The upper floor will be devoted to the nurses and staff, except the matron, who will have a room downstairs. The estimated cost of the site and

building, the equipment not included, is 2,250*l*. Messrs. Adkin and Hill, of Bradford, are the architects, and the contract for mason's work has been let to Messrs. Waugh and Son, of Ilkley, and that for joiner's work to Mr. Thomas Smith, also of Ilkley.

CASUAL WARDS, HACKNEY.—The new casual wards erected by the Hackney Board of Guardians at Gainsborough-road, Hackney Wick, were opened on the 7th inst. The wards have been erected from the plans of Mr. W. A. Finch, the Guardians' architect, Finsbury-pavement, E.C., and provide a nominal accommodation for 106 inmates, including sixty-two men and forty-four women and children, but the building has been so arranged that this accommodation in times of pressure can be considerably increased. The building contract amounted to 25,100*l*., and the work has been executed by Messrs. Perry Bros., of Bishops-road, Cambridge Heath. The engineering contract amounted to 3,559*l*., and was carried out by Messrs. W. J. Fraser and Co., of Commercial-road, E.

BATHS, GARSTON.—Mr. W. R. Court, the Engineer and chief superintendent of the Liverpool Corporation bathing establishments, has prepared sketch plans, which have been approved by the Baths Committee, for the public baths which it is proposed to erect in Garston.

NEW PREMISES, TOTTENHAM COURT-ROAD.—The premises at 64-67, Tottenham Court-road have been rebuilt for Messrs. Catesby. The lower portion of the elevation is of polished granite with massive columns, the upper portion of Portland stone with Ruabon red facings. There are two ornamental copper domes to roof. The interior fittings, including the carved oak and teak staircase, are a special feature. The whole of the work (including fittings) was carried out by Messrs. Patman and Fotheringham, Ltd., builders and contractors, of Theobald's-road, W.C., and Liverpool-road, Islington, N., from the plans and under the supervision of the architect, Mr. H. A. Whitburn, of Surrey-street, Strand, W.C., and of Woking.

WAREHOUSE, GLASGOW.—With reference to a paragraph which appeared under this heading in our last issue, Messrs. Alexander Ritchie and Co., of Upper Thames-street, E.C., ask us to state that they supplied the ten electric-light pillars for the outside of the premises.

CO-OPERATIVE SOCIETY OFFICES, LEICESTER.—The new offices which have been erected by the Leicester Co-operative Society at the corner of Union-street and Freeschool-lane, Leicester, were opened recently. The architect was Mr. Arthur H. Hind, and the work was carried out by the building department of the Society.

STAINED GLASS AND DECORATION.

WINDOWS, TRINITY METHODIST CHURCH, PUDSEY.—Two stained-glass memorial windows have just been placed in this church. The subject represented is "Christ the Consoler." The figure is standing with open arms saying, "Come unto Me all ye that are weary." Around him are the various representatives of the human race—the Magdalene, the prisoner, the traveller, the penitent, the mother with her sick child—and holding on to the robe of Christ is a little child who has found a friend in Him. In the other window the subject is "Dorcas," who is represented giving away garments to those who are in need. These windows have been designed and executed at the studios of Messrs. Kayll and Co., Leeds. The architecture of the building is classic, and the subjects are surrounded by a classical canopy in silvery tones.

MEMORIAL WINDOW, NEWCASTLE.—A memorial window was unveiled on the 26th ult., in the Jesmond Presbyterian Church, Newcastle, in memory of the late Alderman John Price, J.P. The new window consists of three lights, and it has been placed in the chancel of the church. The artists for the work were Messrs. Kempe, of London.

MEMORIAL WINDOWS, PREMNAY, N.B.—Two stained-glass memorial windows have been placed in the Parish Church, Premnay. Mr. E. Copland, of Aberdeen, designed and executed the work. The subject of the windows is "Easter Morning."

APPOINTMENTS.

THE USHER HALL SURVEYOR, EDINBURGH.—At a meeting of the Lord Provost's Committee of Edinburgh Town Council, held on the 6th inst., a motion by Councillor Fraser as to the appointment of a surveyor for the new City Hall was under consideration. It was agreed to recommend approval of the appointment of Mr. George Morham, 29, Hanover-street, and to remit to a Sub-Committee to report on the terms of the appointment.

SANITARY AND ENGINEERING NEWS.

WATER SUPPLY, LIVERPOOL.—The new reservoir at Prescot was opened by Lady Derby on the 30th ult. The reservoir is capable of holding 121,950,000 gallons, the total contents to ordinary draw off level being 110,213,000 gallons, equivalent to a four days' supply for Liverpool and the out districts served by the Corporation. The capacity of the reservoirs previously in use at Prescot is 86,000,000, equal to a three days' supply. The area of the water surface of the new reservoir is upwards of 27 acres, and the mean depth to the overflow level is 15½ ft. The contractors were Messrs. Holme and King; the engineer was Mr. J. Parry, and the resident engineer was Mr. J. R. Davidson. The cost of the work has been 138,365*l*.

NEW LIGHTHOUSE, DUNGENESS.—At Dungeness on the 31st ult. the new lighthouse, which has taken two years to construct, was brought into use for the first time. The old lighthouse which it replaces was built 114 years ago. The new lighthouse is circular in shape and 140 ft. high from base to top of the lantern. It stands 40 yds. inland from the old lighthouse. In addition to the high lighthouse a low light 40 ft. high has been erected close to the shoreline over a powerful foghorn. The main high light gives flashes every ten seconds. It is a white flash, lasting ·88 second, with an intensity of 144,000 candle power. A subsidiary light is exhibited from the same tower, showing red and green sectors. The focal plane of the main light is 130 ft. above high-water mark. The luminant used in the lantern is oil gas, burnt on the incandescent principle, the oil being vaporised. The old lighthouse is to be immediately demolished, except the base, which is being extended for residential and other purposes in connexion with lighthouse work. Mr. T. Matthews is the Engineer-in-Chief to the Corporation of Trinity House.

FOREIGN.

FRANCE.—In the Municipal Conservatories of Paris, on the Cours la Reine, an exhibition has been opened of the works of Isabey and of Raffet; also a collection of lithographs ("Salon National des Arts Lithographiques") and of illustrated postcards. The Salon des Pastellistes Français has also been opened at the Georges Petit Gallery; it includes works by MM. Aman-Jean, Besnard, Billotte, Latouche, Le Sidaner, Lhermitte, Georges Picard, and Mdme. Lemaire.——M. Carlier, the sculptor, has just completed a statue for the garden of the Elysée, under the title, "Danse Profane." It is to have as companion a statue by M. Ségoffin, entitled "Danse Sacrée."——The monument to the memory of Gambetta, which was the last work of Dalou, is in course of erection at Bordeaux, on the Allées de Tourny.——A monument in honour of the Republic is to be erected at Vichy; the model for it has just been completed by M. Coulon.——The works are shortly to be commenced for a new series of pavilions, to be added to the hospital at Noirmautier.——The new Ecole des Beaux-Arts, at Tourcoing, has been opened.——The Société des Amis des Arts, at Besançon, has organised an interesting exhibition of clocks and watches from the time of Louis XIV. to Napoléon.——The jury, in the competition opened at Annecy for the best new drainage system for the town, has awarded the first premium to M. Augustin Bonfort.——Important improvement works, including the erection of a new Casino, are to be undertaken at Paris Plage (Pas de Calais), at an estimated cast of 2,000,000 francs.——A stone bridge is to be built over the Loire at Digoin, in place of the old suspension bridge. The cost is estimated at 500,000 francs.——The death is announced, at the age of eighty-four, of Mdme. Herbelin, a miniature painter of great talent, and who enjoyed a high reputation in the time of the Second Empire.——M. Louis Seglas, architect, a former pupil of M. Guadet, has died at Paris, at the age of thirty-three. He had been, since last year, a member of the Société Centrale.——We have also to announce the death of M. Fernand Chailloux, the sculptor, the author of the monument erected to Pasteur, at Marnes. He was only twenty-six years of age. M. Chailloux was a pupil of M. Jules Thomas, and of the Ecole des Beaux-Arts.

BUILDING TRADES EXHIBITION IN SHEFFIELD.—From the 15th to the 23rd inst. the Drill Hall, Edmund-road, Sheffield, will be handed over to members of the building trade and others closely allied to that industry. The desire is to give manufacturers an opportunity of displaying their goods in a practical manner before the many thousands of interested buyers included in the district of which Sheffield is the centre. The organisers of the exhibition are Mr. C. D. Smith and Mr. J. W. Norman.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. E. Swinfen Harris, F.R.I.B.A., has removed from his former London office (8 and 9, Essex-street, Strand) to 40, Chancery-lane.——A partnership has been arranged by Mr. J. M. Porter with Mr. Adam Hunter, who for some time has assisted him in his business. The firm will be known as "J. M. Porter and Hunter," and will continue the practice as architects, surveyors, estate agents, and valuers at the Estate Office, Colwyn Bay.——Mr. A. Hessell Tiltman, architect, has removed to No. 1, Raymond-buildings, Gray's Inn, W.C. (first floor).

NEW CITY SHOWROOMS.—Messrs. J. Line and Sons, of 162 and 163, Aldersgate-street, and of Berners-street, Oxford-street, have just extended their city premises in Aldersgate-street by the addition of a new showroom. The firm has had showrooms at the West-End branch for many years, but, with a view to meeting the convenience of city architects, they have fitted up a large room on the ground floor in connexion with the Aldersgate-street premises, which is suitably designed for the purpose in view, viz., the exhibition of the wall-papers and other goods in which the firm deals. The room has been designed by Mr. Mayes, one of the staff, hand-stencilled, block-printed, and all kinds of wall-papers being displayed in the panels, while decorations in relief, etc., of the firm's latest designs are to be seen. A convenient arrangement for the exhibition of wall-papers and friezes is the cabinet-screen. The cabinet is constructed to contain a large number of screens, which can be drawn back so as to give the visitor a clear idea of the effect of different designs. Two of the most noticeable friezes are the "Fishing Fleet" frieze and the "Venetian" frieze, which are made so that the view repeats only once in 24 yds.

BIRKDALE IMPROVEMENT BILL.—Mr. Heywood Johnstone's Select Committee of the House of Commons has passed the preamble of the Birkdale Improvement Bill with various amendments. The bill contains a number of regulations dealing with the construction of new streets and sewers. The Committee struck out Clause 47, which sought to make a person erecting a building to a greater height than any adjoining building at his own expense build up the flues and chimneys so that the top thereof should be uniform with the top of the chimneys of the building so erected. They also struck out a clause limiting the height of buildings to be erected. It was agreed to give the local authority power to make by-laws dealing with the materials with which new buildings should be constructed, and for enforcing the use of fire-resisting materials where a new building was to be used by different families.

POLLOCK'S PATENT DOOR FURNITURE.—Mr. Pollock, of Messrs. John Pollock and Son, sends us a sample of a new patent for attaching door-knobs. One of the knobs is pierced with a circular opening about ¾ in. in diameter; the spindle goes through to near the surface of this knob, the end of it being made with a screw thread. A brass screw cap the size of the opening in the knob screws on to this. The frequent trouble of the knob coming off the spindle is thus rendered impossible. The appearance of the screw cap in the middle of the knob may be thought a little unsightly, but, except for door furniture which is decoratively treated, the advantage of firm and permanent attachment fully counterbalances this. The furniture is made and supplied by Mr. Barrett, ironmonger.

ADVANCED INSTRUCTION FOR PLUMBERS.—Arrangements, we understand, are now being made for the Special Course of Advanced Instruction for Plumbers at King's College, London, under the auspices of the Plumbers' Company and several of the County and Municipal Education authorities. The company have specially equipped workshops and laboratories at the college for the purpose of giving advanced instruction in the principles of science underlying the operations of the plumber, as well as in the practice of the plumbing craft, to plumbers who are, or are likely to become, teachers of plumbing classes. By these means it is hoped to train up an efficient body of teachers. The classes are held in the summer of each year, and plumbing teachers and advanced students desirous of availing themselves of the facilities available at the College should apply to the Education Authority of the town or county in which they reside for the requisite grant or scholarship to enable them to attend.

CLOCK, ST. PETER'S CHURCH, CARMARTHEN.—On Palm Sunday the Lord Bishop of St. David's dedicated a new Westminster chiming clock in St. Peter's Parish Church. The clock has one large dial facing west, and it has been made generally to the designs of Lord Grimthorpe by Messrs. John Smith and Sons, of Derby.

MEMORIAL TABLET, ELY.—A memorial to the men of the Isle of Ely who fell in the South African War was recently unveiled in Ely Cathedral. The tablet has been executed in brass by Mr. M. A. Moore, of London.

CHURCH BUILDING IN THE DIOCESE OF YORK.—On the 5th inst. the Archbishop of York presided at the twenty-fifth annual meeting of the York Diocesan Church Extension Society in the Zouche Chapel, York Minster. Canon Pearson presented the annual report, which contained a review of the Society's operations, and mentioned that during the past twenty-five years in four of the more populous deaneries twenty-eight new churches have been built. In 1878 Hull had twenty—it now has twenty-six; in 1878 Rotherham had twenty-five—it now has thirty-two; Sheffield had thirty-one—it now has forty-one. In 1878 there was no Deanery of Middlesbrough—it was included in that of Stokesley. The town of Middlesbrough then had five churches—it now has ten.

THE SECRETARY FOR SCOTLAND AND BUILDING ACCIDENTS.—In the course of his visit to Glasgow on the 8th inst., Mr. Graham Murray, the Secretary for Scotland, received a deputation from the Parliamentary Committee of the Trades Congress, with representatives of workmen in the building trade from Glasgow, Edinburgh, Perth, Dundee, Aberdeen, and other towns in Scotland. The deputation urged that there was insufficient provision for protecting workmen against accident owing to unsafe scaffolding in connexion with the erection of buildings. Mr. Graham Murray, in reply, expressed himself as in hearty sympathy with the object of the deputation in taking measures to prevent injury or death. So far as Glasgow was concerned, there were, he thought, sufficient powers contained in the Buildings Regulations Act for carrying out what the deputation asked. To deal with the subject generally, he advised that a private member of Parliament should be asked to introduce a measure dealing with the subject. He was of the opinion that it would be for local authorities rather than the Government to appoint inspectors, as conditions differed in different towns.—*Scotsman.*

FIRES IN LONDON.—Much interesting information is given in the annual report of the Chief Officer of the London Fire Brigade which has just been compiled. The fires last year reported to the Brigade were 3,400 in number, 174 fewer than in the preceding year, and only sixty-one of these were classed as serious, as compared with seventy-six. The satisfactory results attained, the Chief Officer considers, are due in great measure to the augmention of the staff, appliances, and horses of the brigade, and of the facilities for securing rapid and efficient mobilisation. Details are given of the nature of the premises on which fires occurred during the year, and the causes of the outbreak. There were thirty fires on the premises of builders, all of which were of a slight character, and they were due to the following causes:—Tar boiling over, 3; fumigating adjoining house, 1; escape of gas, 1; hot ashes, 2; overheating of furnace, 1; light thrown down, 9; spark from fire, 2; spark from locomotive, 3; varnish upset, 1; unknown, 7. Amongst other premises on which fires occurred were the following:—Art metal workers, 1; art potters, 1; artists, 3; asphalte makers and paviors, 2; cabinet-makers, 29; carpenters and workers in wood, 5; carvers and gilders, 1; churches and chapels, 6; colleges, 3; contractors, 31; Government buildings, 7; hospitals, 9; house decorators, 2; lead and glass merchants, 5; lime and cement workers, 2; painters, glaziers, and plumbers, 2; parquet-flooring manufacturer, 1; potteries, 1; public buildings, 4; saw mills, 6; schools, 11; sign-writers, 2; stone and marble masons, 2; theatres and music halls, 7; and timber merchants, 11.

LAMPS AND SIGNS IN THE CITY.—The Streets Committee of the Public Health Department at the Guildhall has just issued a series of regulations relating to lamps, clocks, cranes, and projecting boards within the City. In future every application for a lamp, clock, or crane must be accompanied by drawings showing the dimensions, mode of fixing, and total projection from the frontage line. Lamps not used for shop-window lighting must not be less than 12 ft. from the footway, while their external dimensions, including frame and ornaments, must not exceed 5 ft. in height and 3 ft. in any other direction. They must not project more than 4 ft. 6 in. from the front of the house, or be less than 2 ft. from the carriage-way. Advertisements may be placed on the sides, but not on the bottoms, of such lamps, which must be kept lighted from sunset until the premises upon which they are fixed are closed. With regard to lamps used for shop-window lighting, the underside portion must not be less than 8 ft. from the pavement, the extreme projection over the public way not exceeding 3 ft. when the width of the pavement permits, and not less than 2 ft. from the carriage-way. The external dimensions of such lamps must not exceed 2 ft. 3 in. in any direction. No lettering, by way of advertisement, will be permitted on the dials of clocks, which must be synchronised with Greenwich time at the expense of the owners. Trade advertisement boards may be erected provided they do not exceed 3 ft. in width by 2 ft. in height and 3 ft. in thickness, with a projection of not more than 3 ft. 6 in. from the front of the building to the extreme edge of the board or tablet, but in no instance beyond 2 ft. inside the line of kerb. The height of such projections must in future be of a minimum of 9 ft. from the pavement to the underside of the board.—*Times.*

A QUESTION OF ASSESSMENT.—The appeal of Mr. Charles King Smith against the assessment of the Golden Valley Paper Mills, Bitton, near Bristol, which has been pending since June, 1903, and which was entered for hearing at the Quarter Sessions for the County of Gloucester just concluded, has been settled by compromise at a rateable value of 700*l.*, with an undertaking by the Assessment Committee that this figure shall not be disturbed for a period of three and a half years, and that they will pay the whole of the costs. The assessment objected to was a gross estimated rental of 1,300*l.* and a rateable value of 975*l.* The appeal was conducted by Messrs. Humphreys-Davies and Co., Surveyors to the Machinery Users' Association, of which the appellant was a member.

GOVERNMENT BUILDINGS AND BY-LAWS.—The Public Health Committees of Wandsworth, Southwark, and Battersea decided this week to support the appeal of Islington Borough Council to the Prime Minister asking him to promote legislation with a view to Government buildings being placed under the same by-laws as other buildings in respect of drainage and sanitary arrangements and the inspection thereof. A number of local authorities have the matter still under consideration

RESIGNATION OF THE SURVEYOR FOR SCOTLAND.—Mr. W. W. Robertson, F.S.I., F.S.A. (Scot.), who for twenty-seven years has been the Principal Architect and Surveyor for Scotland of the Commissioners of H.M. Works and Public Buildings, has resigned his appointment and retired on a pension. Mr. Robertson recently suffered from a severe attack of illness. Mr. T. Oldrieve, from the Board of Works Office, London, has been appointed Mr. Robertson's successor.

CHELTENHAM COLLEGE WAR MEMORIAL.—The Right Rev. J. Taylor-Smith, Chaplain-General of the Forces, recently dedicated to the memory of the fifty-four Old Cheltonians who fell in the South African War a reredos which has been placed in the College Chapel. The reredos forms only a part of the memorial which will perpetuate the deeds of Cheltonians at the war. In June last an Eleanor Cross was unveiled in front of the College buildings by an Old Cheltonian, the late Sir Power Palmer, formerly Commander-in-Chief of the Indian Army. The reredos, designed by Mr. H. A. Prothero, himself an Old Cheltonian, follows more or less the lines of the great altar screens at Winchester and St. Albans. It fills the whole of the east wall of the chapel, beneath the window, and it reaches to a height of 24 ft. and a width of 34 ft. The architectural scheme comprises three main departments, divided by four pierced buttresses. The subject expresses two ideas, universal and national. The central and dominating figure is that of the Christ on the Cross. To the left of the Crucifixion group appear large figures (each more than 4 ft. high) of founders and champions of Christianity in this island. Nearer to the Crucifixion group and still on the left side are representations of four great archbishops, viz., Dunstan, Anselm, Becket, and Langton, each carrying the archiepiscopal cross and each being distinguished characteristically. On the Gospel side of the Cross are four representatives of the English Bible and Prayer-book—the Venerable Bede, Thomas Cranmer, John Wycliffe, and William Tyndall—and the larger figures on this side are representations of English Christian worthies. There are smaller statues in the two other departments of the reredos.—*Birmingham Post.*

CAPITAL AND LABOUR.

BRICKLAYERS' LABOURERS' STRIKE, TAMWORTH.—The bricklayers' labourers of Tamworth and district have struck work. They demand an increase of ¼d. per hour in their wages, which would bring their remuneration up to 6d. per hour. A uniformity in wages is also sought, and also the allowance of "walking time."

THE LEICESTER PAINTING TRADE.—A dispute has occurred in the Leicester painting trade. It is alleged by the operatives that they recently gave notice for a revision of the working rules, following the course laid down by agreement between employers and employed. In accordance with this agreement, the question should be submitted to a board comprising an equal number of employers and men, but it is said the masters refuse to meet. By resolution the operatives have agreed to appoint a deputation to prevail upon the employers to meet the board.

TEESSIDE JOINERS' WAGES.—The joiners employed in the building trade at the Hartlepools, Middlesbrough, and Stockton have given notice to the Teesside Master Builders' Association of their intention to demand an increase of their wages from 9½d. to 10d. per hour. The Association gave notice to the joiners nearly three months ago of their intention to enforce a reduction of a 1d. per hour at the end of the present month, and the application for an increase is a response to this. The men contend that the building trade is not so depressed as the masters would have them believe.

Legal.

EMPLOYER'S APPEAL UNDER THE WORKMEN'S COMPENSATION ACT.

THE case of Brindle *v.* Jones came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Romer and Mathew, on the 12th inst., on the appeal of the defendant from an award of the Judge of the County Court of Chorley (Lancashire) made under the Workmen's Compensation Act, 1897. The learned Judge awarded a total sum of 234*l.*, and the defendant now appealed on the grounds (1) that the employment in which John Brindle, the workman, who was killed, was engaged when he met with his death was not an employment covered by the Act; and (2) that the Judge was wrong in holding that the building upon which the workmap was engaged at the time of the accident was "being repaired by means of scaffolding." It appeared that the defendant had contracted to carry out certain repairs to a building, and he sent three men, including the deceased, to the job. An hour after commencing work the accident occurred. The men were engaged in whitewashing an outside wall, each standing on a ladder, when the ladder on which the deceased was standing gave way and he fell from a considerable height and was killed. The question raised in the court below was whether the deceased at the time of the accident was engaged upon a building which was being repaired by means of scaffolding. The learned County Court Judge held that the ladders which the workmen were using at the time did not in themselves constitute scaffolding, but he found that scaffolding was being used, inasmuch as a step ladder from which a board passed to a wall had been placed in position for the purpose of, at some time, whitewashing another part of the building. He, therefore, was of opinion that the case came within the Act, and awarded the sum before-mentioned by way of compensation. Hence the present appeal, in support of which it was pointed out that up to the time when the accident happened the board and step ladder had not been used.

At the conclusion of the arguments of counsel, the Master of the Rolls, in giving judgment, said it was a queston of fact in this case whether or not scaffolding was being used on the building at the time of the accident. The County Court Judge held that scaffolding was being used and there was ample evidence to justify such a conclusion. The fact that the injured workman was in no way concerned with the scaffolding, or that it was something entirely remote from the part of the building on which he was engaged, did not affect his right of action under the Act. When once it was ascertained that scaffolding was being used, then the right of the workman came in, and he was entitled to compensation under the Act. He thought that the appeal failed and must be dismissed with costs..

The Lords Justices concurred.

Order accordingly.

Mr. Ruegg, K.C., and Mr. A. Elliott appeared for the appellant, and Mr. Ernest E. Wild for the respondent.

BUILDERS' APPEAL UNDER THE WORKMEN'S COMPENSATION ACT.

THE case of Norman and Burt *v.* Walder came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Romer and Mathew, on the 12th inst., on the appeal of the employers from the decision of the Judge of the Hayward's Heath County

Court under the Workmen's Compensation Act, 1897. It appeared that the applicant was a machinist in the employment of the appellants, builders and contractors, and when the accident occurred he was in receipt of wages amounting to 1*l.* 17*s.* a week, out of which he maintained himself, his wife, and his two children. In May, 1901, the applicant met with an accident in the course of his employment, the result of which was that he lost the top joint of one finger and injured another. In the following August an award was made in his favour under the Act for a weekly sum of 18*s.* 6*d.* In May, 1903, the appellants applied to the County Court Judge under schedule 1 of the Act to review the award by terminating or diminishing the weekly payments on the ground that since the accident the applicant had set up in business as a baker, at which he was said to be earning money. The County Court Judge, after hearing evidence, reserved his decision as to whether the earnings of a trade business could be treated as "earnings" within the meaning of schedule 1, paragraph 2, of the Act, and he came to the conclusion that according to the true construction of the schedule wage-earning capacity alone was to be taken into account. The County Court Judge said it was difficult to say what proportion of the total earnings in the business ought to be treated as the applicant's own labour, but he estimated the total earnings in the business at 2*l.* a week. That, he thought, was immaterial as compensation to a workman, for personal injury was in his opinion clearly assessable with reference to weekly wages or earnings earned before the injury, and weekly earnings or wages earned after the injury, and he thought that trade profits in a business were no more to be taken into account than income of real estate. He, therefore, dismissed the application with costs. Hence the present appeal.

At the conclusion of the arguments of counsel, the Master of the Rolls, in giving judgment, after stating the facts, said he thought the County Court Judge had taken much too narrow a view of the construction of the Act. The County Court Judge had not found with any exactness the portion of the profits attributable to the applicant as the earnings arising from his exertions, as he had held that it had nothing to do with the discussion of the matter before him, and that, unless the employers could show that that which the workman had received after the accident was "wages" paid by an employer, the amount of any such earnings had no relevancy to the discussion. In his lordship's opinion, paragraph 2 did not in terms exclude earnings other than those earned from an employer. He was of opinion that the appeal must be allowed, and that the case must be then remitted to the County Court Judge to be considered on all its merits.

The Lords Justices concurred.

Mr. Arthur Powell, K.C., and Mr. Addington Willis appeared for the appellants; and Mr. Stuart Bevan for the applicant (the respondent on the appeal).

BRICKLAYER'S DEATH BY LIGHTNING.

THE case of Mary Andrew *v.* Failsworth Industrial Society, Ltd., came before the Court of Appeal, composed of the Master of the Rolls and Lords Justices Romer and Mathew, on the 13th inst., on the appeal of the defendants from a decision of the Judge of the Oldham County Court, who held that the applicant was entitled to recover compensation under the Workmen's Compensation Act for the loss of her husband, a bricklayer, who was killed by lightning while engaged in work on some buildings which were being erected by the defendants. In support of the appeal, it was contended that the man's death was not caused by an accident arising out of his employment within the meaning of the Act.

The Master of the Rolls, without calling upon counsel for the applicant, in giving judgment, said it was a perfectly clear case, not *primâ facie* in itself, but from the extremely lucid judgment of the County Court Judge, who had distinguished between the law and the facts, and pointed out how he arrived at his decision. The learned Judge had properly stated the law in regard to the matter when he said that if he came to the conclusion that the position in which the man was employed was dangerous, and that in consequence of that dangerous position the accident occurred, he would be entitled to hold that the accident arose out of the employment. The Judge had come to the conclusion that in the position in which the man was working he would be exposed to an abnormal risk of being struck by lightning, and it seemed to him (the Master of the Rolls) that there was ample evidence to justify that finding. For these reasons the appeal failed.

The Lords Justices concurred, and the appeal was accordingly dismissed with costs.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

8,863 of 1903.—J. HULL and B. HILL: *Window Sash Fastener.*

This relates to window sash fasteners of the kind in which a bar, pivoted to one sash, swivels across the other, usually into a catch or detent device, by which the interlock is sufficient to prevent a vertical movement on the part of either sash. An ordinary swivel bar is pivotally mounted on the transome bar of one sash, usually the upper and outer sash, corresponding to which a plate on the transome bar of the other sash is mounted. The knob usually provided on the swivel bar by being riveted thereto, or otherwise made integral therewith, is, for the purpose of the invention, fitted into a hole bored through the end of the swivel bar, and is furnished with a thread to screw into a hole tapped in the plate on the other bar, which is made wider and thicker for this purpose. A shoulder on the knob screw to flange up against the swivel bar enables the knob screw to screw all tight together, thereby preventing all jar in the window sashes.

9,903 of 1903.—I. C. WALLAS and J. WARD: *Means applicable for use in Supporting Pipes or Radiators for Heating or other purposes.*

A support, comprising two members constructed in such a manner as to permit of the member carrying the pipes or radiators being adjusted altitudinally, and a standard furnished with a detachable hanger or carrier which is capable of vertical adjustment.

10,291 of 1903.—D. FOULIS: *Means for Opening and Closing Sliding Doors, Lids, Shutters, Ventilators, and the like, particularly applicable to the Doors of Poultry Houses, Coops, Kennels, Cages, and the like for birds and other animals.*

This consists in opening and closing, rising and falling of doors, lids, or shutters of poultry houses, coops, kennels, cages, ventilators, and the like for birds and other animals, by providing a pendant retaining arm revoluble upon a horizontal axis carried on a stationary part of the structure, a loop or loops, formed in the said retaining arm, and an outwardly inclined tail portion below such loop, in combination with a ratchet-shaped tooth, fixed upon the door or moving part and having a downwardly inclined upper surface, so that upon the door being lifted the moving part or the tooth acts upon the tail of the arm to raise same until the tooth enters the loop and the door is held, while the upper inclined edge of the tooth is calculated upon the further raising of the door to act upon the upper part of the loop, and the arm is thrown out about its fulcrum and permits the door to descend.

388 of 1904.—E. GOGLER and H. SEINFELD: *A Process for Manufacturing White Cement.*

A process for manufacturing white cement in which materials containing lime or silicic acid, or lime, sand, or pure silicic acid, either in their natural state or after having been burned, are mixed with a quantity of alkaline carbonates, the amount of which may vary from an amount equal to the weight of the silicates contained in the mixture to three times its weight, then melted, and the resulting mass lixiviated and dried with the object of obtaining, without being obliged to resort to the employment of too great a heat, a pure white cement which is distinguished by its hardness and does not decrease in bulk when in the water.

2,828 of 1904.—H. G. BRUNCKHORST: *A Method of Making Walls, Movable Partitions, and the like.*

A method of making walls, movable partitions, and the like, according to which horizontal and vertical or other suitably arranged wires are interwoven and drawn taut, and fabrics or other suitable material drawn through the meshes so formed, after which the partition may be finished.

13,616 of 1903.—G. P. CAMPBELL: *Process for, and Apparatus for, Manufacturing Building Blocks, and the like.*

The process consists in well mixing together a quantity of slaked lime and sand, afterwards putting same into a mould so constructed as to make the block hollow as required, then subjecting the mixture to pressure, and afterwards removing the block from the mould and piling a number of such blocks upon a platform waggon and subjecting the whole to the action of high pressure steam in a closed chamber for about ten hours, after which time the blocks may be withdrawn and are ready for use.

27,031 of 1903.—J. H. PINNOCK, P. C. RUSHEN, and O. E. SEELEY: *Means for Promoting Ventilation.*

A means for use in promoting ventilating of the interior of a building provided with a window opening, having at its upper part a sash adapted to be slidden downward to open communication at that part between the exterior and interior, the said means consisting essentially in the arrangement of a baffle across the upper part of such a window opening and extending downwardly parallel or approximately parallel to the face of the sash and at some little distance therefrom on its exterior side. The construction and arrangement of the said baffle being such that very little or no light is obstructed thereby, and when the said sash is lowered to a certain extent air cannot pass to the exterior in any appreciable quantity by way of the opening so formed above the lowered sash except through the space between the baffle and the exterior face of the sash, into which space it is difficult for outside currents of air to enter.

10,413 of 1903.—G. A. POLSON: *Automatic Fire Alarms.*

An automatic fire alarm, comprising contact spring arms, normally held apart by means of wires, or the like, the said wires being arranged to separate upon the temperature exceeding a certain limit so as to cause the contact arms to come together and make electrical contact.

10,516 of 1903.—A. E. WOOD and A. E. BLIZZARD: *Means for Supporting Tiles in Position during Firing.*

The object of this invention is to provide a support for tiles to take the place of saddles, props, and thimbles, in order that the tiles may be held more securely in their position and that a greater number of tiles may be placed in a given space of the oven or kiln. The support is in the shape of a rectangular parallelopiped of length somewhat less than the side of a tile of breadth a little greater than twice the thickness of a tile and any convenient thickness. Each support has two or more holes tapered and square in cross section carrying plugs. These plugs project below the support and keep the faces of the two tiles on which the support rests apart. The support may have a ridge at each end of its upper and lower faces so as only to come in contact with the tiles along this ridge.

10,744 of 1903.—W. J. CLEMSON: *Foundations for Windmill, and other Towers.*

This consists of a basework comprising a strong centre piece rigid with horizontal arms and adapted to receive a single mast, or in constructional towers each of the uprights, said arms being sufficiently long to take foundation bolts, feet, or the like.

26,903 of 1903.—T. P. HUGHES: *Bolts for Doors, and the like.*

In bolts for airtight compartments, cupboards, and the like, the combination of two oppositely and simultaneously moving bolts, whose inner ends are connected to a rotating device operated by a handle or key.

3,194 of 1904.—S. D. NAYLOR and J. P. JACKSON: *Door Latch.*

This consists in the combination in a door latch, or the like, of an inclined or faced tooth on the handle bar acting through a slot in the sliding latch in such a manner that the catch is opened or closed by simply pushing or pulling the door knob or handle horizontally instead of turning, or partially turning, the same.

3,676 of 1904.—H. H. LAKE (Gebruder Braun): *Manufacture of Cement and like Pipes.*

Process for the manufacture of stone asphalt pipes, characterised by the fact that pipes are made of cement and powdered slag, or the like, with surfaces as rough as possible and treated internally with a mass of highly-heated asphalt and externally with finely-powdered coke, for the purpose of obtaining an exceedingly penetrating impregnation with smooth inner, and rough outer, surfaces.

27,452 of 1903.—W. A. FRITZ: *Combined Apparatus for Mixing Cement, Mortar, and the like, and for Hoisting or Elevating Materials for use in Building Operations.*

This consists in the combination with a frame having leg standards, of a receptacle rotatably mounted thereon, elevating means including block and tackle connected to the frame, a pulley carried by the frame and engaged by the tackle for rotation thereby, a counter-shaft carried by the frame, and drive connections between the pulley and the counter-shaft, and also between the counter-shaft and the receptacle.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

8,003 of 1903.—H. HAWGOOD: *Hinges.*

The hinge is made of three parts, the centre one of which is jointed on either side, one side attached to the post plate and the other to the door plate. A hole is made through the three plates through which a roller chain passes, and into tubes attached to the back of the post and door plates wire spiral springs are inserted, through which also the chain passes. At both ends of the chain a stop is fixed to draw the springs against the plates while the door is opening either way, and for keeping the door closed when not in use. The door plate has a wing attached on either side to clip and strengthen the stile of the door where the tube is inserted. One or more of these chain actions can be used to each hinge.

10,036 of 1903.—P. E. GARDNER: *Chimneys, Chimney-pots, Ventilating Shafts, and the like.*

A chimney-pot, ventilating shaft, or the like, having, suitably mounted or suspended within it, a plate which may either hang vertically or which is capable, under the influence of the wind acting upon its exposed part, of closing the chimney or shaft on the downward side and leaving it open on the leeward side.

10,367 of 1903.—T. J. PALMER: *Manufacture of Moulded or Embossed Panels, and the like.*

The manufacture of moulded or embossed panels, or the like, by taking millboard forming material and applying the pressure necessary to make it into millboard by means of plates or rollers, or a plate and a roller, one of which is, or both of which are, formed for embossing or moulding whilst exerting the requisite pressure for making the millboard.

10,427 of 1903.—E. E. M. MITCHEL: *Walls of Tents, Huts, and the like.*

A wall for tents, huts, and the like, consisting of a series of curtains of canvas, or the like material, each arranged to slide on one of a series of rods or wires which are arranged in parallel vertical surfaces or in the same vertical surface and at different heights.

10,461 of 1903.—A. E. G. BROMELL and D. LEGG: *Window Catches, and the like.*

The window catch is constructed with a projecting lip on a compressing piece connected to a flat bracket or projection on each side, which is connected to one or more bolts with a spring on each side of the casing attached to a pin at the bottom of the case, or in any other convenient place. Connected to each bracket of the compresser is a stud which is connected to a bolt or bolts by a connecting link or links with a slot in the centre. In this slot and connected to the casing is a pivot so placed that when pressure is applied to the compresser, the connecting link or links between the compresser and the bolt working round this pivot withdraws the bolt or bolts by one movement. When pressure is taken off the compresser, the spring or springs, being suitably placed, force the bolt or bolts into the window sash and rack or other convenient place, and so effectually holds the window in any desired position in the window frame.

10,966 of 1903.—R. PENDLEBURY: *Means for Securing Door Knobs to Lock Spindles.*

The invention consists in the method of fixing the knob to the end of the square bar which passes through the lock. Inside the knob a brass or other metal square bush is mounted, and, having a square holt through it, is inserted from the side nearest the lock, the hole in the bush being the same size as the bar at the end nearest the lock and a little larger at the end furthest from the lock. The bar has a hole drilled in its end in the direction of its length about 1 in. deep, and adapted to receive a screw. For about ¼ in. from the end of the bar each flat side has a slit cut into it, in the direction of the length of the bar. The knob is pushed on to the end of the square bar to the required position, then the screw with the conical head is passed through a hole in the knob and so enters the end of the bar. When screwed tight the conical part of the screw expands the end of the bar, the slits in the bar allowing this expansion to take place and so fill the larger end of the square hole in the bush, and thus form a dovetail which prevents the knob from being drawn off the bar.

11,359 of 1903.—J. W. KNIGHT and W. DRAKE: *Method of Making Concrete Slabs or Blocks and Apparatus Therefor.*

A method of manufacturing concrete slabs or blocks, consisting of separately pressing or ramming sufficient moistened material of which the concrete is composed in a mould, to consecutively form a number of slabs or blocks one above the other, said slabs or blocks being divided by metallic or other sheets for facilitating separation thereof when the mould is inverted and removed and the slabs or blocks have set or hardened.

23,562 of 1903.—F. SCHAUMBURG: *Machine for Making Grooved Blocks from Prepared Lengths, and for Feeding the Blocks into the Magazine of a Machine for the Manufacture of Mosaic Parquetry Slabs.*

A machine for making grooved blocks from prepared rectangular lengths for the manufacture of parquetry slabs, comprsing a conveyor which carries lengths twice past each of two saw shafts for grooving the lengths, and then past a saw shaft for cutting up the lengths between every two peripheral groovings, whereby the four sides of the lengths are grooved by means of only two saw shafts.

26,343 of 1903.—R. W. H. RODNEY: *Window Sash Fastener.*

This invention is an improvement on the class of fasteners made in two portions, one of each of which is secured to each sash, and in connexion with which there is no spring attached to the hook or hasp. The latter when turned into engaging position is held there by the weight of a solid sliding sleeve, whose weight may be, however, augmented by a spring pressure. In making this sash fastener, two plates are cast and pierced with two screw holes on either side their central boss and from the surface. To the central boss of one a hook is pivoted made with a stop to limit its movement to 90 degrees, and to the other boss a vertical plain pin is fixed with a head having first threaded on a small spiral spring and a heavy solid sleeve of cylindrical shape, whose lower end is parallel and fits exactly into and through the inner diameter of the hook when closed and touches the plate boss.

437 of 1904.—E. M. EDWARDS: *An Arrangement for Securing Tiles to Stoves, Grates, and the like.*

This consists of a casing for holding tiles, which are required to be fixed to stoves, grates, kitcheners, sanitary appliances, lavatory stands, bath casings, furniture, and the like, and is to be secured in its position by one or more springs or fixing pieces.

1,774 of 1904.—J. KOHOUSEK: *Key-hole Guards or Closing Devices.*

A key-hole closing device, consisting of a small safety lock, corresponding in shape to that of the key-hole to be closed, said lock comprising a bolt provided with a latch adapted to be withdrawn into the bolt, and, upon being advanced by means of a slide or disc in the interior of the safety lock operated by the bit of the key of the safety lock, to engage behind the cover plate of the door lock casing, while a pin on the safety lock casing may engage with the key-hole plate of the door lock casing, thus preventing the key-hole closing device from being turned.

1,890 of 1904.—A. KURZWERNHART: *Siemens' Regenerative Furnaces.*

A method of avoiding loss of gas in Siemens' regenerative furnaces, wherein, before the reversing operation, the gas contained in the regenerative chamber and in the passages connected therewith, is forced into the furnace by air which, after the gas has been cut off in a known manner, is introduced through a lateral opening.

2,447 of 1904.—C. GIELOW and B. ALEXANDER-KATZ: *Edge Runners and Pans.*

An edge runner and pan, consisting of a stepped grinding surface and stepped runners whose part having the material conducted to it first is at the greatest distance from the grinding surface, and whose part acting upon the material last bears upon the grinding surface.

2,843 of 1904.—H. CARDON: *Apparatus for Making Combined Wire and Wood Fencing.*

An apparatus for making combined wire and wood fencing, consisting of a pair of guide arms pivotally mounted at the forward end of the twisting mechanism, the ends of which are arranged to be brought close together and held in that position by means of a pair of parallel bars operated by a lever.

3,769 of 1904.—F. W. HOWORTH (F. Jurschina): *Manufacture of Artificial Stone.*

The manufacture of artificial stones, ornaments, figures, and the like, which consists in mixing cement, a solution of soda-silicate (water glass), clay, and sand, a powdered porphry, basalt, or granite, the clay being dissolved or suspended in the water-glass solution before the aforementioned substances are mixed together, for the purpose of saturating the clay thoroughly with the water-glass solution, maintaining the strength in degrees Bé of the latter at a constant amount during the working operations, preventing an evaporation of the water from the water-glass solution during the subsequent burning of the ware, which, in consequence of the retardation of the setting or binding, does not become burnt or slagged.

6,202 of 1903.—R. WILKE: *Means for Altering the Direction of Motion of Cranes and other Large Structures.*

A device for altering the direction of motion of cranes, travelling stages, or the like, moving on tracks, comprising in combination the arrangement that the wheels or groups of wheels are pivoted on vertical pivots, and that at each crossing point or branch-off point each rail of the track is provided with a separate turntable for altering the direction of the wheel or group of wheels resting upon it.

6,247 of 1903.—J. H. MAGENS: *Treatment of Concrete, and the like, whereby the Setting of the same after Mixture may be Arrested.*

A process for storing ready-mixed cement concrete, cement, concrete cement mortar, and the like, without impairing its setting or binding power, in which the cement concrete, etc., is, immediately after its being mixed, cooled to, or nearly to, its freezing point and afterwards maintained in such frozen state till it is used.

7,762 of 1903.—J. W. BATEMAN: *Fire Escape Life-saving Apparatus.*

This invention relates to a load-lowering device, more particularly applicable for use as a fire escape and life-saving apparatus, and has for its object to provide an apparatus which can be instantly fixed in position ready for lowering a load or for lowering persons from the various floors of a building. According to this invention, two jaws are provided for the purpose, for example, of application over the window sill, the jaws being of such length as to extend downwardly respectively on the exterior and the interior of the wall. A screwed rod or spindle is provided, one end of which is carried by one of the jaws, while the other passes through the other jaw, and is provided with an adjusting device by means of which the ends of the jaws may be brought together so as to engage with the wall, and thus be firmly and securely fixed in position.

7,338 of 1903.—R. W. NEWLANDS: *Protractors and the like.*

This consists in constructing apparatus for rapidly and accurately taking and indicating angles from two-hinged members in combination with a marked loose bisecting strip, which strip has a pivotal connexion with the end of one member when used for indicating the angle, and indicates the angle of the hinged members by placing one edge against a pin on the end of the other member.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

March 29.—By DEBENHAM, TEWSON, & Co.

Bloomsbury.—39, Bloomsbury-sq., u.t. 27½ yrs., g.r. 20*l.*, p. £2,200

By FISHER, STANHOPE, & DRAKE.

Stoke Newington.—73, Lordship-rd., and ½ an acre, u.t. 38½ yrs., g.r. 8*l.* 10s., p 795

By MCINTOSH & Co.

Old Kent-rd.—21 to 29 (odd), Earl-rd., u.t. 16½ yrs., g.r. 15*l.*, w.r. 182*l.* 725

Lambeth.—100 and 102, Waterloo-rd. (s.), u.t. 18½ yrs., g.r. nil, y.r. 154*l.* 1,310

Peckham.—Hook's-rd., "The Duke of Cambridge," p.h., f.g.r. 5*l.*, reversion in 49 yrs. 265

By MORGAN, BAINES, & CLARK.

Holmwood, Surrey.—Thurban's-hill, freehold building site 100

By A. H. TURNER & Co.

Hampton Wick, Middlesex.—"Cambridge House," and about 1 acre, f., p. 2,700

By FREDK. WARMAN.

Canonbury.—6 and 8, Canonbury-st., u.t. 41 yrs., g.r. 15*l.*, y.r. 84*l.* 905

32, Pyrland-rd., u.t. 45 yrs., g.r. 6*l.* 6s., y.r. 47*l.* 10s. 445

Muswell Hill.—3, Lancaster-villas, u.t. 93½ yrs., g.r. 12*l.* 12s., e.r. 70*l.* 650

Canonbury.—17, St. Mary's-rd., u.t. 41 yrs., g.r. 2*l.*, e.r. 65*l.* 650

March 30.—By JOHN BOTT & SONS.

Brixton.—62, Saltoun rd., u.t. 69 yrs., g.r. 6*l.* 6s., w.r. 65*l.* 420

22 and 24, Lynham-rd., u.t. 22½ yrs., g.r. 5*l.*, w.r. 44*l.* 4s. 210

Norwood.—65 and 67, Dunbard-st., u.t. 59 yrs., g.r. 5*l.* 12s., w.r. 41*l.* 12s. 170

Dulwich.—17, 19, and 21, Clive-rd., u.t. 48 yrs., g.r. 8*l.*, w.r. 58*l.* 1s. 4d. 320

Herne Hill.—197 and 199, Norwood-rd., f., y.r. 84*l.* 980

A. HARRIS & Co.

Holloway.—75, Landseer-rd., u.t. 246 yrs., g.r. 3*l.* 3s., e.r. 33*l.* 15s. 220

ROBINS, GORE, & MERCER.

St. Pancras.—51, William-st., u.t. 20½ yrs., g.r. 20*l.*, w.r. 75*l.* 8s. 175

62 and 68, Stanhope-st., u.t. 17 yrs., g.r. 4*l.*, w.r. 171*l.* 12s. 620

27, Clarence-gdns., u.t. 19½ yrs., g.r. 18*l.*, w.r. 78*l.* 200

28, Clarence-gdns., u.t. 19½ yrs., g.r. 18*l.*, w.r. 78*l.* 200

By DOUGLAS YOUNG & Co.

Clerkenwell.—29, Red Lion-st., f., y.r. 50*l.* .. 800

Battersea.—63 and 65, Queen's-rd. (s.), u.t. 73 yrs., g.r. 18*l.* 18s., y.r. 129*l.* 2s. 1,000

Clapham.—16, Studley-rd., u.t. 20 yrs., g.r. 5*l.*, y.r. 40*l.* 300

By G. LOVEITT & SONS (at Nuneaton).

Nuneaton, Warwick. — Bridge-st., "Bridge House," with malthouse, area 727 yds., f., p. £2,000

March 31.—By BACH & SMITH.

Paddington.—358, Harrow-rd. (s.), u.t. 59 yrs., g.r. 11*l.*, y.r., 105*l.* 1,585

69, Amberley-rd., u.t. 58½ yrs., g.r. 7*l.*, y.r. 50*l.* 390

Clapham.—151a, Clapham-rd., f., y.r. 50*l.* 800

April 7.—By FIELD & SONS.

Bermondsey.—29, Drummond-rd., u.t. 30 yrs., g.r. 3*l.* 10s., w.r. 41*l.* 12s. 245

By BATCHELAR & SON (at Croydon).

Croydon.—74 to 80 (even), Leighton-st. East, f., w.r. 61*l.* 2s. 640

99, Queen's-rd., f., w.r. 28*l.* 12s. 295

4 and 6, Bridge-pl., f., w.r. 32*l.* 10s. 290

2, Bridge-ter., f., w.r. 13*l.* 120

64, Cross-st., f., w.r. 16*l.* 18s. 165

April 8.—By A. PREVOST & SON.

Stepney.—69, Shandy-st. (dairy premises), u.t. 13 yrs., g.r. 22*l.*, e.r. 94*l.* 18s. 150

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops; ct. for court.

MEETINGS.

FRIDAY, APRIL 15.

Institution of Mechanical Engineers.—Paper to be further discussed: "Compound Locomotives in France," by M. Edouard Sauvage, Chief Consulting Engineer, Western Railway of France. 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—7 p.m.

SATURDAY, APRIL 16.

Royal Institution.—Mr. Cyril Davenport, F.S.A., on "Mezzotints." 3 p.m.

MONDAY, APRIL 18.

Royal Institute of British Architects.—Mr. E. S. Prior on "The Statues of Wells Front, with some Contemporary Foreign Examples of Sculpture," illustrated by lantern views. 8 p.m.

Surveyors' Institution. — Mr. Thomas Blashill on "London Streets and London Street Traffic." 8 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—7 p.m.

Liverpool Architectural Society. — Annual General Meeting. 6 p.m.

TUESDAY, APRIL 19.

Institution of Civil Engineers.—Mr. J. M. Henderson on "Aerial Suspension-Cableways." 8 p.m.

Society of Arts (Applied Art Section).—Mr. Alfred East, A.R.A., on "The Sentiment of Decoration." Mr. Walter Crane, R.W.S., will preside. 8 p.m.

Builders' Clerks' Benevolent Institution. — Twenty-sixth Annual Dinner, King's Hall, Holborn Restaurant. 6 p.m.

Dundee Institute of Architecture.—Mr. James Adamson on "Music and Art in Renaissance." 8 p.m.

WEDNESDAY, APRIL 20.

British Archæological Association.—(1) Mr. R. E. Leader, B.A., President, on "Sheffield Cutlery and the Poll Tax of 1379." (2) Mr. A. Denton Cheney, F.R.Hist.Soc., on "Shepway Cross." 8 p.m.

Society of Arts.—Mr. Mervyn O'Gorman, M.Inst.E.E., on "Motor Cars for Popular Use." 8 p.m.

Sanitary Institute (Lectures and Demonstrations for Sanitary Officers). — (1) Inspection at Harrison and Barber's Knacker Yard, Winthrop-street, Whitechapel, E. 3 p.m. (2) Lecture by Dr. E. P. Manby. 7 p.m.

Edinburgh Architectural Association.—Annual Business Meeting and President's Valedictory Address. 8 p.m.

Institute of Sanitary Engineers, Ltd.—Extraordinary General Meeting. 4.30 p.m.

Builders' Foremen and Clerks of Works' Institution.—Quarterly Meeting of the Members. 8 p.m.

THURSDAY, APRIL 21.

Royal Institution.—Professor Dewar on "Dissociation," II. 5 p.m.

Society for the Encouragement of the Fine Arts.—Paper by Sir Wyke Bayliss, P.R.B.A., F.S.A., entitled "In the House of Her Friends" (art in relation to the sanitary condition of our great cities). Sir W. B. Richmond, K.C.B., R.A., in the chair. 8 p.m.

Institution of Civil Engineers (Special Meeting).—The Twelfth "James Forrest" Lecture ("Internal Combustion Motors"), by Mr. Dugald Clerk, M.Inst.C.E. 8 p.m.

FRIDAY, APRIL 22.

Architectural Association.—Mr. W. Gilbert on "Craftsmanship." 7.30 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. P. Manby on "The Hygiene of Byres, Lairs, Cowsheds, and Slaughter-houses." 7 p.m.

Institution of Civil Engineers (Students' Meeting).—Mr. A. Trewby, B.A., on "No. 2 River-Pier of the Beckton Gasworks." 8 p.m.

SATURDAY, APRIL 23.

Architectural Association.—Visit to the New War Office Buildings, Whitehall. 2.30 p.m.

Royal Institution.—Mr. Cyril Davenport, F.S.A., on "Cameos." 3 p.m.

Incorporated Association of Municipal and County Engineers.—Eastern District Meeting at Great Grimsby.

Edinburgh Architectural Association.—Visit to Glasgow under the auspices of the Glasgow Architectural Association.

Sanitary Institute (Provincial Meeting at the Town Hall, Cardiff). — Discussion on "School Hygiene in connexion with the Duties and Responsibilities of the New Education Authorities," to be opened by Dr. E. Walford. The chair will be taken by Mr. W. Whitaker, Chairman of Council of the Institute. In the afternoon a visit will be made to the Isolation Hospital and Crematorium on Flat Holm Island.

TO CORRESPONDENTS.

J. E.—H. S.—J. W. R.—F. H.—S. W. P.—H. J. C.—H. H. N. (Below our limit).—J. A. H.—D. S. (Amount should have been stated).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER and not to the Editor.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and Quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£ s. d.	
Hard Stocks	1 16 0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1 13 0	" " "
Facing Stocks	2 12 0	" " "
Shippers	2 10 0	" " "
Flettons	1 10 0	" at railway depôt.
Red Wire Cuts	1 13 0	" " "
Best Fareham Red	3 12 0	" " "
Best Red Pressed Ruabon Facing	5 0 0	" " "
Best Blue Pressed Staffordshire	4 4 0	" " "
Do. Bullnose	4 10 0	" " "
Best Stourbridge Fire Bricks	4 8 0	" " "
GLAZED BRICKS.		
Best White and Ivory Glazed Stretchers	13 0 0	" " "
Headers	12 0 0	" " "
Quoins, Bullnose, and Flats	17 0 0	" " "
Double Stretchers	19 0 0	" " "
Double Headers	16 0 0	" " "
One Side and two Ends	19 0 0	" " "
Two Sides and one End	20 0 0	" " "
Splays, Chamferred, Squints	20 0 0	" " "
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	" " "
Quoins, Bullnose, and Flats	14 0 0	" " "
Double Stretchers	15 0 0	" " "
Double Headers	14 0 0	" " "
One Side and two Ends	15 0 0	" " "
Two Sides and one End	15 0 0	" " "
Splays, Chamferred, Squints	14 0 0	" " "
Second Quality, White and Dipped Salt Glazed	2 0 0	" less than best.

	s. d.	
Thames and Pit Sand	7 3	per yard, delivered.
Thames Ballast	6 0	" "
Best Portland Cement	30 0	per ton, "
Best Ground Blue Lias Lime	21 0	" "

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	" "
PORTLAND STONE (20 ft. average)—		
Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2 1	" "
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2 2½	" "

	s. d.	
Ancester in blocks	1 11	per ft. cube, deld. rly. depôt.
Beer "	1 6	" "
Greenshill "	1 10	" "
Darley Dale in blocks	2 4	" "
Red Corsehill "	2 5	" "
Closeburn Red Freestone	2 0	" "
Red Mansfield "	2 4	" "
YORK STONE—*Robin Hood Quality*		
Scappled random blocks	2 10	per ft. cube. "
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per foot super. "
6 in. rubbed two sides ditto, ditto	2 6	" "
3 in. sawn two sides slabs (random sizes)	0 11½	" "
2 in. to 2½ in. sawn one side slabs (random sizes)	0 7½	per ft. super. deld. rly. depôt.
1½ in. to 2 in. ditto, ditto	0 6	" "
HARD YORK—		
Scappled random blocks	3 0	per ft. cube "
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2 8	per ft. super. "
6 in. rubbed two sides Ditto	3 0	" "
3 in. sawn two sides (slabs random sizes)	1 2	" "
2 in. self-faced random flags	0 5	" "
Hopton Wood (Hard Bed) in blocks	2 3	per ft. cube. deld. rly. depôt
" " " 6 in. sawn both sides landings	2 7	per ft. super. deld. rly. depôt
" " " 3 in. do.	1 2½	" "

SLATES.

in. in.	£ s. d.	
20 × 10 best blue Bangor	13 2 6	per 1000 of 1200 at r. d.
20 × 12 " "	13 17 6	" "
20 × 10 best seconds	12 15 0	" "
20 × 12 " " "	13 10 0	" "
16 × 8 " " "	7 0 0	" "
20 × 10 best blue Portmadoc	12 12 6	" "
16 × 8 best blue Portmadoc	6 12 6	" "
20 × 10 best Eureka unfading green	15 2 6	" "
20 × 12 " "	17 2 6	" "
18 × 10 " "	12 10 0	" "
16 × 8 " "	10 5 0	" "
20 × 10 permanent green	11 10 0	" "
18 × 10 " "	9 10 0	" "
16 × 8 " "	6 10 0	" "

TILES.

	s. d.	
Best plain red roofing tiles	42 0	per 1000 at rly. depôt.
Hip and Valley tiles	3 7	per doz. " "
Best Brosely tiles	50 0	per 1000 " "
Do. Ornamental tiles	52 6	" " "
Hip and Valley tiles	4 0	per doz. " "
Best Ruabon red, brown, or brindled do. (Edwards)	57 6	per 1000 " "
Do. Ornamental do	60 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 0	" " "
Best Red or Mottled Staffordshire do. (Peakes)	51 9	per 1000 " "
Do. Ornamental do.	54 6	" " "
Hip tiles	4 1	per doz. " "
Valley tiles	3 8	" " "
Best "Rosemary" brand plain tiles	48 0	per 1000 " "
Best Ornamental tiles	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 8	" " "
Best "Hartshill" brand plain tiles, sand faced.	50 0	per 1000 " "
Do. pressed	47 6	" " "
Do. Ornamental do	50 0	" " "
Hip tiles	4 0	per doz. " "
Valley tiles	3 6	" " "

WOOD.

	At per standard. £ s. d.	£ s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	15 10 0	16 10 0
Deals: best 3 by 4	14 10 0	15 10 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11 10 0	12 10 0
Battens: best 2½ by 6 and 3 by 6	0 10 0	less than 7 in. and 8 in.
Deals: seconds	1 0 0	less than best
Battens: seconds	0 10 0	" " "
2 in. by 4 in. and 2 in. by 6 in.	9 0 0	9 10 0
2 in. by 4½ in. and 2 in. by 5 in.	8 10 0	9 10 0
Foreign Sawn Boards—		
1 in. and 1¼ in. by 7 in.	0 10 0	more than battens.
¾ in.	1 0 0	"
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4 10 0	5 0 0
Seconds	4 5 0	4 10 0
Small timber (8 in. to 10 in.)	3 12 6	3 15 0
Small timber (6 in. to 8 in.)	3 0 0	3 10 0
Swedish balks	2 15 0	3 0 0
Pitch-pine timber (30 ft. average)	3 5 0	3 15 0

JOINERS' WOOD.

	At per standard.	
White Sea: first yellow deals, 3 in. by 11 in	23 0 0	24 0 0
3 in. by 9 in.	21 0 0	22 10 0
Battens, 2½ in. and 3 in. by 7 in.	17 0 0	18 10 0
Second yellow deals, 3 in. by 11 in	18 10 0	20 0 0
" " 3 in. by 9 in.	17 10 0	19 0 0
Battens, 2½ in. and 3 in. by 7 in.	13 10 0	14 10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	15 10 0	16 10 0
Battens, 2½ in. and 3 in. by 7 in.	11 10 0	12 10 0
Petersburg: first yellow deals, 3 in. by 11 in.	21 0 0	22 10 0
Do. 3 in. by 9 in.	18 0 0	19 10 0
Battens	13 10 0	15 0 0
Petersburg: second yellow deals, 3 in. by 11 in.	16 0 0	17 0 0
Do. 3 in. by 9 in.	14 10 0	16 0 0
Battens	11 0 0	13 10 0
Third yellow deals, 3 in. by 11 in.	13 10 0	14 0 0
Do. 3 in. by 9 in.	13 0 0	14 0 0
Battens	10 0 0	11 0 0
White Sea and Petersburg:—		
First white deals, 3 in. by 11 in.	14 10 0	15 10 0
" " 3 in. by 9 in.	13 10 0	14 10 0
Battens	11 0 0	12 0 0
Second white deals, 3 in. by 11 in.	13 10 0	14 10 0
" " 3 in. by 9 in.	12 10 0	13 10 0
" " battens	9 10 0	10 10 0
Pitch-pine: deals	16 10 0	20 0 0
Under 2 in. thick extra	0 10 0	1 0 0
Yellow Pine—First, regular sizes	35 0 0	upwards.
Oddments	24 0 0	26 0 0
Seconds, regular sizes	26 10 0	28 10 0
Yellow Pine oddments	22 0 0	24 0 0
Kauri Pine—Planks, per ft. cube	0 3 6	0 5 0

WOOD.—(*continued*).

JOINERS' WOOD (*contd.*).	At per standard. £ s. d.	£ s. d.
Danzig and Stettin Oak Logs—Large, per ft. cube	0 2 6	0 3 6
Small ,, ,,	0 2 3	0 2 6
Wainscot Oak Logs, per ft. cube.	0 5 0	0 5 6
Dry Wainscot Oak, per ft. sup. as inch	0 0 7	0 0 8
¾ in. do. do.	0 0 6½	—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0 0 9	0 0 11
Selected, Figury, per ft. sup. as inch	0 1 6	0 2 0
Dry Walnut, American, per ft. sup. as inch	0 0 10	0 1 0
Teak, per load	17 0 0	21 0 0
American Whitewood Planks—per ft. cube	0 4 0	—
Prepared Flooring—	Per square.	
1 in. by 7 in. yellow, planed and shot	0 13 6	0 17 6
1 in. by 7 in. yellow, planed and matched	0 14 0	0 18 0
1¼ in. by 7 in. yellow, planed and matched	0 16 0	1 0 0
1 in. by 7 in. white, planed and shot	0 12 0	0 14 6
1 in. by 7 in. white, planed and matched	0 12 6	0 15 0
1¼ in. by 7 in. white, planed and matched	0 15 0	0 16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0 11 0	0 13 6
¾ in. by 7 in. do. do. do.	0 14 0	0 18 0
1 in. by 7 in. white do. do.	0 10 0	0 11 6
in. by 7 in. do. do. do.	0 11 6	0 13 6

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £ s. d.	£ s. d.
Rolled Steel Joists, ordinary sections	6 5 0 ...	7 5 0
Compound Girders, ordinary sections	8 2 6 ...	9 5 0
Angles, Tees and Channels, ordinary sections	7 17 6 ...	8 17 6
Flitch Plates	8 5 0 ...	8 15 0
Cast Iron Columns and Stanchions including ordinary patterns...	2 6 ...	8 5 6

METALS.

	Per ton, in London. £ s. d.	£ s. d.
IRON—		
Common Bars	7 5 0 ...	7 15 0
Staffordshire Crown Bars, good merchant quality	7 15 0 ...	8 5 0
Staffordshire "Marked Bars"	10 0 0 ...	—
Mild Steel Bars	8 15 0 ...	9 5 0
Hoop Iron, basis price	9 5 0 ...	9 10 0
,, ,, Galvanized	17 10 0 ...	—

(*And upwards, according to size and gauge.*)

Sheet Iron (Black)—		
Ordinary sizes to 20 g.	9 15 0 ...	—
,, ,, 24 g.	10 15 0 ...	—
,, ,, 26 g.	12 5 0 ...	—
Sheet Iron, Galvanised, flat, ordinary quality—		
Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12 15 0 ...	—
Ordinary sizes to 22 g. and 24 g.	13 5 0 ...	—
,, ,, 26 g.	14 5 0 ...	—
Sheet Iron, Galvanised, flat, best quality—		
Ordinary sizes to 20 g.	16 0 0 ...	—
,, ,, 22 g. and 24 g.	16 10 0 ...	—
,, ,, 26 g.	18 0 0 ...	—
Galvanised Corrugated Sheets—		
Ordinary sizes 6 ft. to 8 ft. 20 g.	12 10 0 ...	—
,, ,, 22 g. and 24 g.	13 0 0 ...	—
,, ,, 26 g.	13 15 0 ...	—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11 15 0 ...	—
Best Soft Steel Sheets, 22 g. & 24 g.	12 15 0 ...	—
,, ,, 26 g.	14 0 0 ...	—
Cut nails, 3 in. to 6 in.	9 0 0 ...	9 10

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London £ s. d.	£ s. d.
LEAD—Sheet, English, 3lb. and up	15 0 0 ...	—
Pipe in coils	15 10 0 ...	—
Soil pipe	18 0 0 ...	—
Compo pipe	18 0 0 ...	—
ZINC—Sheet—		
Vieille Montagne ...ton	26 5 0 ...	—
Silesian	26 0 0 ...	—
COPPER—		
Strong Sheet...per lb.	0 0 10½ ...	—
Thin ,, ... ,,	0 0 11½ ...	—
Copper nails ... ,,	0 0 11 ...	—
BRASS—		
Strong Sheet ... ,,	0 0 10 ...	—
Thin ,, ... ,,	0 0 11 ...	—
TIN—English Ingots ... ,,	0 1 4 ...	—
SOLDER—Plumbers' ... ,,	0 0 6½ ...	—
Tinmen's ... ,,	0 0 8 ...	—
Blowpipe ... ,,	0 0 9 ...	—

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2d. per ft. delivered.
,, fourths	1¼d. ,, ,,
21 oz. thirds	3d. ,, ,,
,, fourths	2¼d. ,, ,,
26 oz. thirds	3¾d. ,, ,,
,, fourths	3d. ,, ,,
32 oz. thirds	4¼d. ,, ,,
,, fourths	4d. ,, ,,
Fluted Sheet, 15 oz.	2¾d. ,, ,,
,, 21 oz.	3¾d. ,, ,,
½ Hartley's Rolled Plate	1½d. ,, ,,
½ ,, ,, ,,	1¾d. ,, ,,
¾ ,, ,, ,,	2¾d. ,, ,,

OILS, &c.

		£ s. d.
Raw Linseed Oil in pipes or barrels	per gallon	0 1 6
,, ,, ,, in drums	,,	0 1 9
Boiled ,, ,, in pipes or barrels	,,	0 1 9
,, ,, ,, in drums	,,	0 2 0
Turpentine, in barrels	,,	0 3 7
,, in drums	,,	0 3 9
Genuine Ground English White Lead	per ton	19 0 0
Red Lead, Dry	,,	19 0 0
Best Linseed Oil Putty	per cwt.	0 7 6
Stockholm Tar	per barrel	1 12 0

VARNISHES, &c.

	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, &c., 26s. per annum. Remittances (payable to J. MORGAN) should be addressed to the Publisher of "THE BUILDER," Catherine-street, W.C.

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TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

ABERDEEN.—For causewaying and drainage of part of Commercial-road, for the Harbour Commissioners. Mr. R. Gordon Nicol, Harbour Engineer, Aberdeen :—

J. McAdam & Sons, 47 and 49, Charlotte-street, Aberdeen.... £6,102 2 5

ABRAM (Lancs.).—For the supply of road materials, for the Urban District Council. Mr. J. Eatock, Surveyor to the Council. Quantities by the Surveyor :—

Setts.

T. C. Catterall, Adlington, near Chorley £417

Kerbs.

J. Southworth, Withnell, near Chorley .. 39

Ballast.

J. Southworth, Withnell, near Chorley .. 43

AUDENSHAW (near Manchester).—For the erection of forty-four dwelling-houses at Stamford-road, etc. Messrs. J. H. Burton & J. A. Percival, architects, 150A, Stamford-street, Ashton-under-Lyne :—

General Trades.

Z. Pike & Son, Hooley Hill* £7,405

[Twenty tenders received.]

Plumbing and Glazing.

H. Pike, Hooley Hill* £636

[Twenty-two tenders received.]

BARGOED.—For conversion, with extensions, of Nos. 80, 81, and 82, Cardiff-road, into business premises surgery, etc., for Dr. E. R. Bowen, M.D. Mr. P. Vivian Jones, architect, Hengoed :—

Vodden & Lee, Gilfach, Bargoed, viâ Cardiff* £800

BEACONSFIELD.—For new hotel and stabling at Beaconsfield Station, for Messrs. Weller. Mr. Arthur Vernon, architect, 9, Strand, Charing Cross, London, W.C., and High Wycombe, Bucks. :—

J. K. Cooper & Sons	£3,097 0	F. G. Rust	£2,832 14
G. Darlington	3,060 0	C. H. Hunt & Son	2,593 0
Webster & Cannon	2,888 0	J. Mead	2,585 0
Y. J. Lovell	2,845 0	H. Flint	2,493 0
		G. H. Gibson	2,437 0

BEDLINOG.—For erecting twenty houses, for the Bedlinog Building Club. Mr. P. Vivian Jones, architect, Hengoed :—

W. Watts, Brynbenlog, Dowlais* £4,100

CARDIFF.—For the erection of the superstructure of a new pavilion in the Cardiff Arms Park, for the Joint Committee of the Cardiff Cricket and Football Clubs. Messrs. Veall & Sant, architects, Cardiff :—

Boulton & Paul	£2,135 0	Knox & Wells	£2,010 0
H. Gibbon	2,100 0	Melhuish Bros.	1,989 0
Symonds & Co.	2,064 14	Gibson Bros., Cardiff*	1,981 0
W. Harbrow	2,050 0		
W. Thomas & Co.	2,049 0		

CHELMSFORD.—For 657 yards of 3-in. c.i. water pipes, 48 yards of 9-in. ditto, etc., for the Rural District Council. Mr. J. Dewhirst, surveyor and engineer, Avenue-chambers, Chelmsford :—

Clay-cross Coal and Iron Co., near Chesterfield* .... £5 1 8 per ton for 3-in. pipes. 4 17 6 ,, ,, ,, 9-in. pipes. 9 0 0 ,, ,, ,, specials.

[Twelve tenders received.]

CHELMSFORD.—For the construction of a 9-in. stoneware and c.i. pipe sewer and laying water mains, for the Rural District Council. Mr. J. Dewhirst, surveyor and engineer, Avenue-chambers, Chelmsford :—

Moran & Co.	£768 0 0	J. Jackson	£555 7 9
J. Rayner	698 0 0	G. G. Rayner, Croydon*	495 1 0
F. Johnson	634 16 7		
Wilson, Border, & Co.	555 10 0		

CHELTENHAM.—For the supply of cement for making slabs, for the Borough Council. Mr. J. S. Pickering, Borough Surveyor, Municipal Offices, Cheltenham :—

	Per ton.
Sessions & Sons, Ltd.	£1 19 6
Costling & Co.	1 17 6
A. Knowles & Co.	1 17 0
Trechmann, Weeks, & Co., Ltd.	1 16 3
Rugby P.C. Co.	1 16 0
C. Nelson & Co., Ltd.	1 16 0
J. J. Lee	1 15 6
R. Stephenson & Son, Ltd.	1 15 0
Greaves, Bull, & Lakin	1 15 0
J. Board & Co., Ltd.	1 14 11
B. W. Pearce & Co., Ltd.	1 14 0
Bridgwater Portland Cement Co.	1 13 6
Kaye & Co., Ltd.	1 13 6
Powell, Gwinnell, & Co., Ltd.	1 13 5
B. J. Forder & Son, Ltd.	1 12 3
Aberthaw Portland Cement Manufacturers, Ltd.	1 12 0
South Wales Portland Cement & Lime Co., Ltd., Lower Penarth, nr. Cardiff*	1 12 0

CHIPPENHAM.—For rebuilding the Little George Inn, for Messrs. Wilkins, Bros., & Hudson. Mr. H. W. Matthews, architect, Institute-chambers, Terrace-walk, Bath. Quantities by architect :—

Parsons	£4,298 0	Mould Bros.	£4,030 0
Chancellor & Sons	4,295 0	Rudman	3,937 0
Erwood & Morris	4,256 0	Smith & Light, Chippenham†	3,798 17
Long & Sons	4,245 0	F. Carter	3,776 0
Wills & Sons	4,138 0		
H. Linzey	4,070 0		

CHIPPENHAM.—For the enlargement of the sorting office at Chippenham Station, for the Commissioners of H.M. Works and Public Buildings :—

		Credit Old Materials.
A. Wills & Sons	£1,698	£5 10
W. J. Bloxham	1,793	60 0
W. Light & Son	1,889	30 0
J. Long & Sons	1,967	28 0
Downing & Rudman	1,974	32 0
Stephens, Bastow & Co., Ltd.	1,995	—

CROSS KEYS.—For alterations, additions, and repairs to Eagle Inn, Cross Keys. Mr. E. N. Johnson, architect, Risca, Newport, Mon. :—

C. H. Reed	£375 0	J. Charles	£340 0
J. Jenkins	357 0	Leadbeter Bros.	311 17
E. C. Jordan	355 0		

DALMUIR.—For electric distribution at Dalmuir Outfall Works, for the Glasgow Corporation. Messrs. D. & H. Home Morton, C.E., 130, Bath-street, Glasgow :—

A. Low, 78, Merkland-street, Partick, Glasgow* £2,705 2 5

EASTBOURNE.—For improvements in Beltring-terrace, for the Highways and Drainage Committee. Mr. D. J. Bowe, Borough Surveyor, Town Hall, Eastbourne :—

Carrington & Russell	£197 0 0
M. Hookham	107 5 0
A. Hudson, Eastbourne*	105 0 0

EYEMOUTH (Berwick).—For the erection of public conveniences on quayside, for the Eyemouth Harbour Trustees and Eyemouth Town Council jointly. Mr. William Gray, architect, Ivy-place, Berwick-on-Tweed :—

H. Elliot & Sons, Berwick-on-Tweed	£228 0
P. Edgar, Eyemouth	237 15

GREAT FLOAT (near Birkenhead).—For roof boarding and painting in connexion with erection of additions to purifier house at gasworks, for Wallasey Urban District Council. Mr. J. H. Crowther, Engineer :—

L. Lindfield, Hoylake £287

GRIMSBY.—For the erection of a twenty-stall stable, cart-shed, foremen's offices, etc., Middle Six Acres, Doughty-road, for the Household Scavenging Sub-Committee. Mr. H. Gilbert Whyatt, Borough Engineer and Surveyor, Town Hall-square, Grimsby. Quantities by Engineer :—

Waterman	£1,800 15 0
Hewins & Goodhand	1,740 0 0
Gilbert & Kirton	1,734 14 0
Cook, Grimsby*	1,699 12 0

HARROGATE.—For the construction of sewage purification works, Spofforth (Contract No. 3), for the Corporation. Mr. E. W. Dixon, Engineer, 5, Prospect-crescent, Harrogate :—

H. Arnold & Son, Doncaster* £17,104

HUDDERSFIELD.—Accepted for the erection of a house, out-offices, and boundary walls in Bradford-road North, Fartown. Mr. A. V. A. Lofthouse, architect, Fartown, Huddersfield :—

Mason and Bricklayer : M. Brook	£224
Carpenter and Joiner : Grant & Hughes	71
Plumber : H. Graham	39
Plasterer : D. Tunnacliffe & Sons	30
Slater : T. B. Tunnacliffe & Sons	17
Iron Work : D. Haigh	10
Concreter : J. E. Dyson	9
Painter : S. Kendall	8

[All of Huddersfield.]

LLANTWIT FARDRE.—For sewerage works at Church Village and The Stank, for the Llantrisant and Llantwit Fardre Rural District Council. Mr. Gower S. Morgan, Engineer, School-street, Pontyclun :—

Price Bros.	£2,021 16 0	F. Ashley	£1,652 17 11
Lewis & Morgan	1,958 16 0	G. Rutter	1,640 3 3
R. J. Mathias	1,847 2 8	Burton & Ringham	1,596 16 10
D. W. Davies	1,810 0 0	J. E. Evans, 233, Inverness-place, Cardiff*	1,553 0 0
Barnes, Chaplin, & Co.	1,805 9 7		
J. Morgan	1,793 7 11		
H. S. Rendell	1,723 7 11		

[Engineer's estimate, £1,725.]

LONDON.—For the construction of a sewer, Porchester-gardens, for the Paddington Borough Council. Mr. E. B. B. Newton, Borough Surveyor, Town Hall, Paddington, W. :—

R. Ballard, Ltd., Child's Hill, N.W.* £357

TENDERS—*Continued on page* 425.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITION.

Nature of Work.	By whom Required.	Premiums	Designs to be Delivered
*Elementary School	Borough of Kingston-on-Thames ..	Not stated	April 21

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be Delivered
Gates & Wrought-Iron Fencing at Recreation Grounds	Manchester Corporation	City Surveyor's Office, Town Hall, Manchester	April 15
Boundary Wall, Whitworth-street Recreation Ground	do.	do.	do.
Gates and Fencing, Charlestown-road, Blackley	do.	do.	do.
Rebuilding the Grapes Hotel, Stoneferry	.....	T. B. Atkinson, Architect, 11, Trinity House-lane, Hull	April 16
Elementary School, Monk's-road, Lincoln	Education Authority	W. Watkins & Son, Architects, Silver-street, Lincoln	April 18
Roding & Cotting of Drains in the Black Sluice Level	Black Sluice Commissioners	F. S. Robins, Surveyor, 5, Horncastle-road, Boston	do.
Painting, etc., Shops and Cottages	Hayfield Co-operative Society	D. Mellor, Secretary	do.
Extension to Waterworks, including Reservoir	Tralee Urban Sanitary Authority	T. A. Casey, Board Room, Gas-terrace, Tralee	do.
Repair of Purifiers and Gasholder at Gasworks	Dundee Gas Commissioners	A. Yuill, Engineer, Gasworks, Dundee	do.
Hydraulic Hoist at Gasworks	do.	do.	do.
Steam Engines and Gas Exhausters, etc.	do.	do.	do.
Additions to House, Princetown-road, Bangor	Mr. S. Wilson	F. W. Lockwood, Architect, 18, Pakenham-street, Belfast	do.
Invalid Children's Carriage for Twenty-four	Bristol Education Committee	W. A. Adams, Sec., Educa. Office, Guildhall, Broad-street, Bristol	do.
Road at Foleshill Works	Gas Committee Coventry Corp.	F. W. Stevenson, Engineer, Gasworks, Coventry	do.
*Timber, etc., at Foleshill Works, for Two Acid Chrs.	do.	do.	do.
Machine Tools	Stalyb'dge, etc., Tramways, etc., Bd.	F. Schofield, Clerk Town Hall, Stalybridge	do.
Additions, etc., St. Andrew's Church, Llwynypia	Rev. R. W. Evans	T. W. Millar, Architect and Surveyor, Mountain Ash	do.
Materials	Bray U.D.C.	P. Mac Donnell, Clerk, Town Hall, Bray	do.
Terra-Cotta, Plym'th-gr. Mun. Sch., Chorlt'n-'-Medl'k	Manchester Education Committee	Deansgate Offices, Manchester	do.
Branch Store at Whitburn	Marsden Indus. and Prov. Soc. Ltd.	J. Hunter, Secretary	do.
Road-making, Cornwallis-road	Maidstone U.D.C.	T. F. Bunting, Borough Surveyor, Fair Meadow, Maidstone	April 19
Cast-Iron Water Pipes (Contract No. 4)	St. Andrews Town Council	W. Watson Burgh Surveyor, St. Andrews	do.
Widening Road between Cowbridge and Pontyclun	Glamorgan County Council	T. M. Franklen, Clerk, Westgate-st., Cardiff	April 20
Police Station, Senghenydd, near Caerphilly	Glamorgan Quar. Sess. Co. Council	do.	do.
Office and Shop Premises, Guiseley	Guisely and Yeadon Coal Co.	H. Chippendale, Architect, Guiseley	do.
*Making-up and Paving Road	Fulham Borough Council	Borough Surveyor, Town Hall, Fulham, S.W.	do.
Residence at The Barton, Hereford	Mr. H. Evans	Groome & Bettington, Architects, Palace-chambers, Hereford	do.
Town Hall and House	Audlem Public Hall Co.	R. Matthews, Architect, Parr's Bank-chambers, Nantwich	do.
One Surface Condenser, Pumps, etc.	Barrow-in-Furness Corporation	C. F. Preston, Town Clerk, Barrow-in-Furness	do.
One Electrically-driven Feed Pump, etc.	do.	do.	do.
Annual Contracts	Walton-on-Thames U.D.C.	R. Wilds, Engineer and Surveyor, Council Offices, Walton	do.
Stores for Sanitary Department	Glasgow Corporation	Peter Fyfe, Sanitary Inspector, 23, Montrose-street, Glasgow	do.
2¾ Miles of Roads and Paths, Cherryhinton	Chesterton R.D.C.	Waters & Worrall, Engineers, 2, Sidney-street, Cambridge	do.
Sewage Tank Ironwork (Duckpits and Altham Wks.)	Burnley Corporation	G. H. Pickles, Borough Surveyor, Town Hall, Burnley	do.
High Speed Engine, etc., at Portrane Aux. Asylum	Richmond District Asylum Com.	Asylum Offices, Grangegorman, Dublin	do.
Electric Underground Cable at the Richmond Asylum	do.	do.	do.
1,000 Tons of Gravel, Portrane Asylum	do.	do.	do.
Making-up Ardwick-road and Spencer-street	Swinton U.D.C.	R. Fowler, Surveyor, Council Offices, Swinton, near Rotherham	do.
Additions, etc., to Yackla Cottages, near Wenvoe	Mr. R. L. Bassett	J. Thomas, F.S.I., 17, Quay-street, Cardiff	do.
Mild Steel Gas, Water, and Steam Piping	East India Ry. Co.	C. W. Young, Secretary, Nicholas-lane, E.C.	do
Fencing Inchberry Public Hall	.....	Mr. Hunter, Orton	do.
Materials	Houghton-le-spring R.D.C.	D. Balfour, Engineer, Houghton-le-Spring, R.S.O.	do.
Making-up Roads	Chiswick U.D.C.	J. Barclay, Surveyor, Town Hall, Chiswick	do.
*Paving Works	Hammersmith Borough Council	Borough Surveyor, Town Hall, Hammersmith	do.
Making-up Holmwood-road	Enfield U.D.C.	R. Collins, Surveyor, Public Offices, Enfield	do.
Two Tenements, Robertson's Close	Edinburgh Town Council	Burgh Surveyor, City-chambers, Edinburgh	do.
Shops and Warehouses, Scott-street, Perth	Co-operative Society	Maclaren & Mackay, Architects, 56, George-street, Perth	April 21
Alterations to Stables at Sewage Farm, West-street	Crewe Town Council	G. Eaton Shore, Borough Surveyor, Crewe	do.
Inclined Retorts, Gaythorn Station	Manchester Corporation	G. Nickson, Gas Department, Town Hall, Manchester	do.
Iron and Steel Work for Inclined Retorts	do.	do.	do.
514,400 Hardwood Sleepers, Central S. African Ry.	The Crown Agent for the Colonies	Whitehall-gardens, S.W.	do.
Electric Light Installation, Woodside District Library	Glasgow Corporation	A. B. Watson, 189, St. Vincent-street, Glasgow	do.
Painting, etc., Police Station, Leeds	Leeds Corporation	City Surveyor's Office, Leeds	do.
Unclimbable Iron Fencing, Sunny Brow Rec. Ground	Gorton U.D.C.	Surveyor, Town Hall, Gorton	do.
Machinery Warehouse, Deal-street, Halifax	.....	J. F. Walsh & G. Nicholas, Architects, Museum-chambers, Halifax	April 22
Making-up Street, near Sydenham-buildings	Aston Manor Borough Council	G. H. Jack, Borough Engineer, Council House, Aston Manor	do.
Furniture, St. George's Temporary Council School, etc.	Gorton Education Committee	W. A. Clegg, Secretary, Town Hall, Gorton	do.
Enl'g'g Tab'rn'le (Eng.) Bap. Chap., Hannah-st., Porth	.....	D. W. Jones, 16, Cemetery-road, Porth	do.
Mission Church, Skewen	Rev. T. C. Phillips	J. Cook Rees, Architect, Neath	do.
Stores	Wallsend Corporation	Corporation Offices, Hugh-street, Wallsend	do.
Road Materials and Carting	Hambledon R.D.C.	G. Lintott, Cranleigh, & S. B. Hasell, Milford Godalming	do.
Twenty-five Houses at Griffithstown	Griffithstown Building Club	D. J. Lougher, Architect, Bank-chambers, Pontypool	do.
Stone	Hartshorne and Seals R.D.C.	G. Farmer, Clerk, Ashby-de-la-Zouch	do.
*Coastguard Signal Stn., etc., Seaham Harb., Durham	Admiralty	Works Dept., Admiralty Office, 21, Northumberland-avenue, W.C.	do.
*Foundations for Engine and Alternator	Bexley U.D.C.	Mordey & Dawbarn, 82, Victoria-street, S.W.	do.
Hardwood Planks for Paving	Hull Corporation	A. E. White, City Engineer, Town Hall, Hull	do.
Two Dwelling Houses, Shilbottle	Sir W. Church	M. Temple Wilson, Architect, Alnwick	do.
1,050 Tons of Blue Guernsey Granite	Romford U.D.C.	The Surveyor, Council Offices, Romford	do.
Materials	Cheltenham Corporation	J. S. Pickering, Borough Surveyor, Municipal Offices, Cheltenham	do.
200 Tons of Lime	Johnstone Town Council	R. C. Stevenson, Town Clerk, Johnstone	do.
Enlargement of Caerphilly Parish Church (Section 1)	Rev. C. L. Price	J. W. Rodger, 14, High-street, Cardiff	April 23
Painting Work at Botley and Rose Hill Cemeteries	Oxford Corporation	City Engineer, Town Hall, Oxford	do.
Stones, Gravel, and Chalk	Wantage R.D.C.	District Surveyor, East Ilsley	do.
Hauling Road Material	do.	do.	do.
Rebuilding the Cow and Snuffers Inn, Llandaff	Rhondda Valley Brewery Co., Ltd.	A. O. Evans, Architect, Pontypridd	do.
Steel Framework for Tramway Car Sheds	Wigan Corporation	J. Slevin, Borough Electrical Engineer, Bradford-place, Wigan	do.
Residence at Adam's Hill, Breinton-road, Hereford	Mr. E. F. Bulmer	Groome & Bettington, Architects, Palace-chambers, Hereford	do.
Temporary Structure, Cathays Park, Cardiff	Torrey-Alexander Mission	W. Beddoe Rees, A.R.I.B.A., 37, St. Mary-street, Cardiff	do.
*700 Yds. Fireclay Piping, etc., nr. Addiewell Ry. St'n	Young's Paraffin, etc., Co., Ltd.	J. W. Anderson, Works Manager, Addiewell, N.B.	do.
Galvanised Iron House, Sligo Fever Hospital	Sligo R.D.C.	M. F. Conlon, Clerk, Court House, Sligo	do.
*Additions to Union Workhouse	Ludlow Union	W. W. Robinson, Architect, 10, King-street, Hereford	do.
Sewerage Works	Frome U.D.C	F. W. Jones, Engineer and Surveyor to the Council	April 25
Storthes Hall Asylum	West Riding County Council	J. Vickers Edwards, County Architect, Wakefield	do.
Jewish Baths, Albert-grove and Leeds-terrace	Leeds Corporation	J. Lane Fox, Architect, Britannia-buildings, Oxford-place, Leeds	do.
Three Cast-Iron Railway Turntables	do.	R. H. Townsley, General Manager, Gas Offices, Leeds	do.
Cast-Iron Pipes, Retort Castings, etc.	do.	do.	do.
Stores	Pontypridd U.D.C.	P. R. A. Willoughby, Engr. & Surv., Council Offices, Pontypridd	do.
Metalling	do.	do.	do.
Sewerage Works, Newall	Otley U.D.C.	J. E. Sharpe, Engineer and Surveyor, Council Offices, Otley	do.
Diversion and Culverting Fallowfield Brook	Manchester Corporation	City Surveyor's Office, Town Hall, Manchester	do.
Cast-Iron Pipes, Derwent Aqueduct (Contract No. 3)	Derwent Valley Water Board	E. Sandeman, Engineer's Office, Bamford, near Sheffield	do.
Steel Girder W'k to Footbr'g over Canal, P'k Approach	Hanley Corporation	J. Lobley, Borough Engineer, Town Hall, Hanley	do.
Cleaning and Painting Station Buildings, Belfast	G.N. Railway Company (Ireland)	Office of District Engineer, Belfast	do.
*Paving Home Park Open Space	Lewisham Borough Council	Surveyor's Department, Town Hall, Catford	do.
*W dening and Surface Draining of Scott's-lane	Beckenham U.D.C.	Council's Surveyor, Beckenham	do.
*New Bridge at Stanwell Hill	County Council of Middlesex	County Engineer, Middlesex Guildhall, Westminster, S.W.	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be Delivered
Stores	Dublin, Wicklow, & Wexford Ry. Co.	M. F. Keogh, Secretary, Westland-row, Dublin	April 26
*Erection of Free Library	Southall-Norwood U.D.C.	R. Brown, Architect, Public Offices, Southall	do.
Steam Motor Carriage	Secretary of State for India	Director-General of Stores, India Office, Whitehall, S.W.	do.
Additions, etc., Railway Inn, Cwmbran	Messrs. Buchan & Co.	T. Roderick, Architect, Clifton-street, Aberdare	do.
Rebuilding the Six Bells, Garndiffaith	do.	do.	do.
Rebuilding the Penywaun Inn, Rhymney	do.	do.	do.
Repairing, etc., Clarence Hotel, Brynmawr	do.	do.	do.
Flags for Graves at Cemeteries	Leeds Corporation	City Surveyor's Office, Leeds	do.
Three Tenements, Lancefield-street	Glasgow Corporation	J. M'Kissack & Son, Architects, 68, West Regent-street, Glasgow	do.
Tools and Stores	East India Railway Company	C. W. Young, Secretary, Nicholas-lane, E.C.	April 27
Electricity Stores	Wallasey U.D.C.	J. A. Crowther, Eng., Elec. Works, Seaview-rd., Liscard, Cheshire	do.
Granite	Thame U.D.C.	W. Parker, Clerk, 2, High-street, Thame	do.
Isolation Hospital, Northallerton	Urban and Rural District Council	W. Fowle, Clerk, Northallerton	do.
630 Super. ft. of Pavement Lights	Blackpool Corporation	J. S. Brodie, Borough Engineer, Town Hall, Blackpool	do.
2 Lancs. B'lers, Laundry Pl't, etc., N. Brunswick-st.	Guardians of North Dublin Union	J. O'Neill, Clerk, Boardroom, North Brunswick-street, Dublin	do.
*Tar Paving Playgrounds at Hafod, etc., Schools	Swansea U.D. School Board	School Board Offices, Cynevor-place, Swansea	do.
Three Cottages, Jordan-street, Buckfastleigh	Co-operative Society	A. Warren, Architect, Fore-street, Buckfastleigh	April 28
Rebuilding Wheatsheaf Inn at Grayswood, Whitley	Surrey Public House Trust Co., Ltd.	E. L. Lunn, Architect, 36, High-street, Guildford	do.
Road Materials	Bosmere and Claydon R.D.C.	J. S. Macgregor, Surveyor, Coddenham	do.
Church at Thuristone, near Penistone		W. Morton, Surveyor, 27, John-street, Sunderland	do.
*Public Underground Convenience	Hackney Borough Council	Borough Engineer, Town Hall, Hackney, N.E	do.
*Supply of Timber	Ordnance Survey	Ordnance Survey Office, Southampton	do.
*New Fire Mains, Hydrants, etc., at Workhouse	St. Mary, Islington, Guardians	W. Smith, Architect, 65, Chancery-lane, W.C.	do.
Police Station at Stamfordham	Northumberland County Council	J. A. Bean, County Surveyor, Moot Hall, Newcastle-on-Tyne	April 29
Court House, Bellingham	do.	do.	do.
2,800 Tons of Steel Pipes and Specials	Port Elizabeth Municipality	Davis & Soper, 54, St. Mary Axe, London, E.C.	do.
*Coastguard Station at Robin Hood's Bay, Yorkshire	Admiralty	Works Department, Admiralty, 21, Northumberland-avenue, W.C.	do.
*Coastguard Station at Whitby, Yorkshire	do.	do.	do.
Thirty Houses, Cork		W. H. Hill & Son, Architects, 28, South-mall, Cork	do.
1,250 Tons of Quartzite Macadam	Bexhill Corporation	G. Ball, Borough Surveyor, Town Hall, Bexhill	do.
Harbour, etc., Works, Liscannor, co. Clare	Board of Public Works	H. Williams, Secretary, Office of Public Works, Dublin	April 30
Permanent Way (Section A)	Royton and Crompton U.D.C.	R. P. Wilson, Engineer, 66, Victoria-street, Westminster	do.
Works and Residence, Springhall-lane, Halifax		C. F. L. Horsfall & Son, Architects, Lord-street-chambers, Halifax	do.
Dressed Buff-coloured Bldg. Stones, Gasw'ks, Granton	Edinburgh and Leith Gas Comm'rs.	W. R. Herring, Engineer, New-street Works, Edinburgh	May 2
*Erection of Workshops and Stores, Neepsend	Sheffield United Gas Light Co.	Company's Engineer, Commercial-street, Sheffield	do.
Road Material	Sheppey R.D.C.	J. Copland, Clerk, Sheerness	May 3
Making-up Bourne-avenue	New Windsor Town Council	Borough Surveyor's Office, Alma-road, Windsor	do.
*Furniture, etc., for Norlington-road School	Leyton District Council	W. Jacques, Architect, 2, Fen-court, E.C.	do.
*Situ Concrete, etc., Paving, Norlington-road School	do.	do.	do.
*New Post Office, Woodford Green	Commissioners of H.M. Works, etc.	J. Wager, H.M. Office of Works, Storey's Gate, S.W.	do.
*Court Room, etc., Police Station, Southend-on-Sea	Essex Standing Joint Committee	F. Whitmore, Architect, Chelmsford	May 4
Business Premises, Eastney-road, Portsmouth	Portsea Island Mutual Co-op. Society	G. E. Smith, Architect, 145, Victoria-road, North Portsmouth	do.
Parochial House at Drumsna		Rev. T. Hourican, P.P., Drumsna, Ireland	May 5
Cranes, etc.	Swansea Harbour Trust	T. Strick, Clerk, Swansea	do.
Stores for Ferry Committee	Wallasey U.D.C.	Manager's Office, Egremont Ferry, Cheshire	May 9
*Enlargement, etc., of Church, Totland Bay	The Committee	Percy Stone, Architect, Newport, Isle of Wight	May 14
*New Town Hall and Fire Brigade Station	Sutton Coldfield Corporation	Borough Surveyor, Council House, Sutton Coldfield	May 16
Heating New Boys' School at Pengam	Gelligaer County School Governors	R. S. Griffiths, Architect, Tonypandy	No date.
Broken Granite, Ragstone, and Flints	East Suffolk County Council	H. Miller, County Surveyor, 16, Museum-street, Ipswich	do.
Plasterers' Wk, 3 pairs of Villas, North-la., Roundhay		W. H. Lister, Architect, 5, Greek-street, Leeds	do.
Eight Cottages in Wyndway-road, Cardiff		Veall & Sant, Architects, Cardiff	do.
Wall Round Burial Ground at Wes. Chapel, Rainow		H. W. Sheldon, Sedley House, Rainow	do.
Enlargement of Nun's-lane School	Gateshead Education Committee	F. W. Purser, Architect, 10, West-street, Gateshead	do.
Ten Houses at Studley	A. Walkes	D. H. Ward, Arch., Warwick-chmbrs., Corporation-st., Birmingham	do.
Paving, etc., Blackrod, Lancs.	U.D.C.	J. Gardner, Clerk to the Council	do.
800 Yards of Railroad to join Midland Railway	Desborough Co-operative Society	D. J. Diver, Engineer, Desborough	do.
*Alterations, etc., to Royal Court Theatre, S.W.		C. E. L. Parkinson, Architect, 44, Bedford-row, W.C.	do.
*Erection of Artisans' Cottages	Southampton Corporation	C. J. Hair, Architect, 23, Portland-terrace, Southampton	do.
*Pulling Down Old Houses, Excavating, etc., Windsor	War Department	Commanding R.E., 41, Charing-cross, S.W.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Clerk of Works	Fulham Guardians	3*l.* 13s. 6d. per week	April 21
*Two Temporary Draughtsmen	Hackney Borough Council	2*l.* 2s. per week each	April 22
*Building Inspector	Cheltenham Corporation	105*l.*	April 23
*Municipal Engineer	Municipality of George Tn., Penang	600*l.*, etc.	April 28

Those marked with an asterisk (*) are advertised in this Number. *Competitions*, iv. *Contracts*, iv. vi. viii. x. *Public Appointments*, xviii.

TENDERS—*Continued from page* 423.

LONDON.—For the erection of a nurses' home in Fulham Palace-road, Hammersmith, W., for the Fulham Guardians. Mr. A. Saxon Snell, architect, 22, Southampton-buildings, Chancery-lane, W.C.:—

		Additional amount for sirapite.
Potter Bros.	£13,498	£60 0 0
W. Reason	13,396	90 0 0
Foster Bros.	12,950	50 0 0
Spencer, Santo, & Co., Ltd.	12,851	136 0 0
T. W. Neath & Son	12,622	109 0 0
J. G. Baker & Son	12,537	50 0 0
W. J. Renshaw	12,475	100 0 0
Leslie & Co., Ltd.	12,449	78 0 0
Cropley Bros., Ltd.	12,350	—
B. E. Nightingale	12,280	72 0 0
W. Wallis	12,232	83 0 0
J. Burgess & Son	12,145	28 8 0
C. Dearing & Sons	11,987	} Omissions and additions equal.
J. Ferguson & Co.	11,460	169 0 0
Cowley & Drake	11,002	—

LONDON.—For making-up roadway and paving footways of Macmurdo-road, Fulham, for the Fulham Borough Council. Mr. F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.:—

G. Wimpey & Co.	£530	H. J. Greenham	£515
B. Nowell & Co.	525	A. B. Champniss*	462
J. Mears & Co.	525		

LONDON.—For making-up roadway and paving footways of Woodlawn-road (section III.), for the Fulham Borough Council. Mr. F. Wood, Borough Surveyor, Town Hall, Fulham, S.W.:—

Harvey Bros.	£622 12 6	G. Wimpey & Co.	£489 0 0
F. Fowles	497 0 0	J. Mears	489 0 0
H. J. Greenham	500 0 0	A.B. Champniss*	469 11 4
B. Nowell & Co.	493 0 0		

LONDON.—For the erection of a nurses' home in Fulham Palace-road, W., for the Guardians of the Poor of Fulham Parish. Mr. Alfred Saxon Snell, architect. Quantities by Mr. W. T. Patten:—

		Extra for plastering in sirapite.
Potter Bros.	£13,498	£60 0
W. Reason	13,396	90 0
Foster Bros.	12,950	50 0
Spencer, Santo, & Co.	12,851	136 0
T. W. Heath & Son	12,622	109 0
J. G. Baker & Son	12,537	50 0
W. J. Renshaw	12,475	100 0
Leslie & Co., Ltd.	12,449	78 0
Cropley Bros., Ltd.	12,350	—
B. E. Nightingale	12,280	72 0
W. Wallis	12,232	83 0
J. Burges & Son	12,145	28 8
C. Dearing & Sons	11,987	—
J. Ferguson & Co.	11,460	169 0
Cowley & Drake, Willesden Green†	11,002	—

LONDON.—For road and sewer works, Causton-road (first section), Highgate, for the Hornsey Town Council. Mr. E. J. Lovegrove, Borough Engineer and Surveyor, Southwood-lane, Highgate, N.:—

J. R. Bateman & Son	£1,854 0 0	G. Bell	£1,411 0 0
Grounds & Newton	1,493 11 9	T. Adams	1,410 1 1
W. Griffiths & Co., Ltd.	1,454 15 6	D. R Paterson, Camden Town*	1,390 18 0

LONDON.—For road-making, Coniston-road (second section), Muswell Hill, for the Hornsey Borough Council. Mr. E. J. Lovegrove, Borough Engineer and Surveyor, Municipal Offices, Southwood-lane, Highgate, N.:—

Foster Bros.	£819 10 0	Grounds & Newton	£630 7 0
R. Ballard, Ltd.	695 0 0	Harvey Bros., 25, Victoria-street*	622 1 7
D. R. Paterson	677 10 0		
W. Griffiths & Co., Ltd.	668 18 8		
T. Adams	663 13 3		

MAENCLOCHOG (Pembroke).—For the erection of a chapel, for the Rev. Rhys Williams. Mr. D. E. Thomas, architect, Victoria-place, Haverfordwest:—

M. Young & Ll. Rees (Mynachlogddu, Clynderwen. Lan Mill Marberth)	£1,100

MERTHYR (Wales).—For alterations at the Golden Lion Inn, Dynevor-street, for Messrs. Giles & Harrap, The Brewery, Merthyr Tydfil. Mr. C. M. Davies, architect, 112, High-street, Merthyr:—

T. Jones	£1,165 0	E. Jones, 1, Aeron-terrace, Dowlais*	£920 0
S. Hawkins	1,120 0		
J. Williams	1,095 0		
M. Warlow	1,089 10		

MIDDLESBROUGH. — For main drainage work (Marton Beck Valley Sewer), for the Corporation. Mr F. Baker, C.E., Borough Engineer, Middlesbrough:—

J. D. Nowell & Sons	£20,021 17 0
W. Waring & Sons	17,308 3 2
B. Frith & Co.	16,077 6 6
R. Hudson & Sons	15,526 13 6
J. G. Spooner	14,653 15 6
Parker & Sharp	14,542 3 3
Underwood Brothers	13,782 19 11
Bentley & Loch	13,478 3 6
J. S. Dawson	13,476 8 0
W. & J. Lant	13,021 11 6
J. B. Fowells & Son	12,757 14 0
G. Bell	12,432 8 4
T. D. Ridley & Sons	12,174 17 0
G. R. Waghorn	11,689 5 0
Johnson & Langley, Leicester*	11,121 19 6
W. Brigg	10,779 1 9
Amount to be added for sanitary pipes, penstocks, and ironwork, supplied by the Corporation	1,005 0 0

[Borough Engineer's estimate, £16,000.]

NORWICH.—For alterations to the Boys' Home, St. Faith's-lane, for the Guardians. Messrs. Morgan & Buckingham, architects, 3, Redwell-street, Norwich:—

J. Burton & Sons, Spencer-street and Stoke-street, Norwich*	£1,265

[Eleven tenders received. Highest was £1,748.]

MORICE TOWN.—For alterations and additions to Morice Town Council Schools, for the Education Committee, Devonport. Mr. H. G. Luff, architect, Devonport:—

	A.	B.
J. Crockerell	£1,577 0 0	£312 0 0
T. May	1,535 0 0	298 0 0
W. E. Blake	1,500 0 0	250 0 0
J. Partridge	1,499 0 0	280 0 0
A. R. Lethbridge & Son	1,225 0 0	265 0 0
J. H. Axworthy	1,189 0 0	365 0 0
J. T. Shepherd	1,184 9 5	256 7 7
Pearce Bros., Embankment-road*	1,164 0 0	250 0 0

OSWALDTWISTLE.—For alterations to the Albert-street Congregational School. Mr. W. Ewood, architect and surveyor. Quantities by architect:—

Plasterer.

J. Barnes, Accrington*	£29 10 0
G. Eastwood	23 19 6

Slating.

Evans & Co.	95 0 0
Farnworth	94 8 6
W. Green, Clayton-le-Moors*	91 10 0

Plumber.

Porter	75 6 0
Tondale	75 2 10
Booth	67 10 0
Sudall	61 10 0
R. T. Kenyon, Rishton*	60 0 0

Mason, etc.

J. Grimshaw	530 0 0
J. Whittaker	487 0 0
W. H. Bury	431 0 0
G. Cunliffe, Accrington*	415 10 0

Joiners.

Pilkington Bros.	261 0 0
Hodgson	255 0 0
Harrison	240 0 0
Hesketh & Co.	204 19 6
S. Booth, Church*	191 0 0

PAISLEY.—For the extension of purifying house and erection of lavatories and stores, Blackstown-road, for the Gas Corporation. Mr. G. R. Hislop, C.E., Paisley Gasworks:—

Mason Work for Purifier House and Store.

D. Brown & Son, Whitehaugh, Paisley £615 1 11

Brickwork of Lavatory.

Moon & McCracken, Motherwell 573 12 11

Iron Roofing of Buildings.

W. Christie & Sons, Underwood, Paisley 725 4 8

Carpenter and Joiner Work.

A. Gemmel, 2, Brown-street, Paisley 181 14 6

Slater Work of Roofs.

J. McLintock, 6, Marshall's-lane, Paisley 245 19 2

Lavatory Fittings, etc.

Doulton & Co., Ltd., Hawkhead, Paisley 190 7 6

PONTYGLAZIER (Cardiganshire).—For new bridge at Pontyglazier, between the parishes of Meline and Whitechurch, for the St. Dogmell's Rural District Council. Mr. A. H. Thomas, architect, Haverfordwest:—

R. Phillips	£340 10	Young Bros., Clynderwen, R.S.O.*	£306 0
Michael & Morgan	339 0		

PONTYMISTER.—For alterations and additions to Mason's Arms, Pontymister. Mr. E. N. Johnson, architect, Risca, Newport, Mon.:—

E. C. Jordan	£500 0 0	J. Jenkins	£471 0 0
T. James	482 9 9	J. Charles	419 0 0
C. H. Reed	475 0 0	Leadbeter Bros.	388 10 0

SANDSEND.—For erecting a small villa residence at Sandsend, Whitby, for Dr. W. E. F. Tinley. Mr. E. H. Smales, architect, 5, Flowergate, Whitby:—

Coverdale & Longhorn	£712 7 6	A. Palframan	£662 14 6
J. Braim & Sons	687 0 0	T. R. Fletcher	624 10 0
R. A. Wilson	682 0 0	J. Kidd, Abbeyter., Whitby*	596 15 0

SEVENOAKS.—For raising the level of road at Chiddingstone Mill, for the Rural District Council. Mr. W. H. Bolt, Surveyor, Leigh, Tonbridge:—

Chittenden & Simmons	£308 0 0	H. Constable	£260 0 0
T. Wood & Sons	282 9 3	J. Cheal, Edenbridge*	207 10 0
S. Kavanagh & Co.	281 0 0		

SPRINGWELL (near Gateshead).—For new schools, with out-offices, for the Usworth School Board. Mr. Stephen Wilkinson, architect, 30, Mosley-street, Newcastle-on-Tyne:—

J. Parkinson & Sons, Ltd.	£4,370 12 2	J. MacElhattan	£3,603 9 9
Davison & Bolam	4,189 19 8	W. Foster	3,550 0 0
H. C. Howe	3,921 4 7	W. C. Tyrie	3,458 5 0
D. Chambers	3,917 7 6	T. Hunter	3,455 0 0
Thompson & Son	3,806 11 2	J. Burnett & Son	3,442 12 0
W. Hall	3,733 12 2	C. Groves	3,400 13 0
J. Ross	3,695 10 1	T. Soulsby	3,378 0 0
H. S. Douglas	3,664 7 5	J. Robinson	3,343 13 4
		D. Bruer, New Washington*	3,178 18 5

ST. ANDREWS, (N.B.).—For providing and laying pipes in South-street, for the Town Council. Mr. W. Watson, Borough Surveyor. Quantities by Surveyor:—

F. Watson & Co., Ltd.	£897
G. Mackay & Son	838
J. Farquharson	825
Carrie Bros.	748
A. Turpie	728
MacLeish Morrison & Co., Perth*	713

TREDEGAR (Wales).—For street improvements at Sirhowy Hill, for the Urban District Council. Mr. W. L. Roach, Surveyor, Bedwellty House, Tredegar:—

Monks & Co., Newport, Mon.* £346 12 0

WADSLEY.—For erecting twelve houses and conveniences in Laird-road, for the Committee of the Ancient Order of Foresters' Investment Association (Sheffield District):—

R. Charlesworth, Parsonage-street, Walkley, Sheffield* £2,890

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